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The trial feeding of a mixture of bone meal and limestone in proportions of one to ten in the regular daily forage ration lessened the frequency and severity of epistaxis in a polo horse after about one month's feeding. In about six weeks the nasal hemorrhages ceased entirely.

* * * *

It is an indisputable fact that for hardness of constitution of the equine race, and the ability to stand up to work of an exacting nature, the dam exerts a greater influence than the sire. Robustness is an inherited factor, and generally more prominent in the female line than in the male.

* * * *

Deafness in a horse is rarely discovered. It is a bad fault in a riding horse, or a hunter. It is of no moment in a commercial animal used in town, or road work. It is a very bad fault in a farm or timber hauling horse where the work is done by command. —*Vet Rec.* 14:26.

* * * *

Horses with large mouths, whiskers, drooping lower lips are generally good, steady workers. They do not wear themselves out. The condition of the teeth is an indication of the existence or want of general constitutional well-being. Strong, clean, well-placed teeth accompany good health.—*Vet. Rec.* 14:26.

In considering qualities which make for longevity of working animals, and hard wear and tear, it goes without saying that breeding from sound stock is the first essential.

* * * *

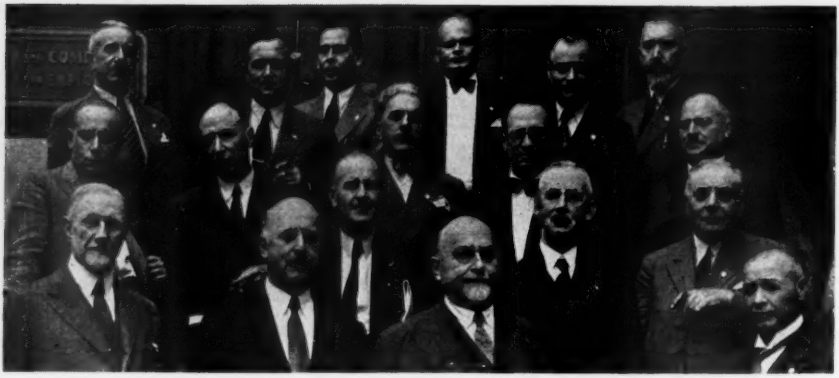
Equine dhobie itch is a verminous dermatitis, chronic and remittent in type and course and characterized by the eruption of a few to many patches of papules and nodules which contain microfilariae.

* * * *

The discovery and elimination of the vectors of certain diseases and the discovery of substances which destroy such organisms as spirochetes and trypanosomes will produce the greatest changes in the future. Until preventive medicine has advanced much further, however, the symtomatic treatment of disease will remain, but this will progressively lose its former undue and unscientific predominance.—*The Vet. Bul.* 4:1.

* * * *

The work at Iowa and Illinois experiment stations has shown definitely that certain pigs possess a high degree of resistance to hog cholera, and that this resistance is transmitted from one generation to another. By selection, pigs have been obtained with a higher degree of resistance than that possessed by any of their ancestors. It is unlikely, however, that it will be possible to obtain a strain immune to this disease.



Delegates to the Twelfth International Veterinary Congress, visiting the Armour packing plant in Chicago. Front row, left to right: Chas. H. Herrick, President, American Institute of Meat Packers; John R. Mohler, Washington, D. C.; A. E. Behnke (deceased); Robert von Ostertag, Germany; Geo. H. Woolridge, England; Paul Rubay, Belgium; Halfdan Holth, Norway. Second row, left to right: Franz Gerlach, Austria; Carlo Bisanti, Italy; Gh. Manolescu, Roumania; Jean Verge, France; Hans Baer, Switzerland. Top row, left to right: Konrad Millak, Poland; Frant. Kral, Czechoslovakia; Alfonso Rivera, Puerto Rico; Francisco Menendez, Puerto Rico; Jan. Lenfeld, Czechoslovakia; and Oluf Bang, Denmark.

Regarding the degree to which certain technical defects militate against the usefulness of working animals, it may be taken for granted, in the first place, that no disability or lameness is hereditary, and that it is only a predisposition to such that is transmitted. —*Vet. Rec.* 14:26.

* * * *

The modern trend of therapeutic and preventive medicine leaves little doubt that many drugs of vague action in the relief of symptoms will be discarded; only those with a specific action and capable of being used with precision being retained. The scientific study of the factors required in the diet for the maintenance in health of all the functions of the body has only just begun, and it may be that the discovery of the necessary constituents of an adequate and healthy diet will remove the necessity for using drugs and chemicals to maintain the apparatus of digestion and elimination in normal working order. Similarly, further knowledge of the endocrine glands and their active constituents will remove the necessity for using merely palliative drugs in the treatment of diseases due to disorders of these organs.—*The Vet. Bul.* 4:1.

Du Toit calls attention to the fact that infectious diseases may be conveyed through the instrument of airplanes in three ways: (1) by conveyance of live animals, (2) by transportation of insect vectors, and (3) by transportation of products containing infective material.

* * * *

In order to develop a scientific attitude, you must develop six fundamental habits of thinking. Look the list over and see how many of these habits you have developed in yourself: (1) Habit of accuracy, (2) Habit of intellectual honesty, (3) Habit of openmindedness, (4) Habit of suspended judgment, (5) Habit of looking for true cause and effect relationships, (6) Habit of criticism, including self-criticism.—*S. N. L.*

* * * *

Baby rabbits, developed from eggs that were fertilized outside the mother's body and carried through gestation in the body of a second rabbit dam, have been produced in the Harvard University Laboratory of general physiology. These little rabbits, "fathered" in a glass flask by sperm extracted from a male rabbit, may be looked upon as the first actual approach to "ectogenesis," or "babies born in a bottle."—*S. N. L.*

Tyzzer finds that the protozoan agent of blackhead, *Histomonas meleagridis,* upon being propagated outside of the body of the bird gradually loses virulence, remaining infective for young turkeys and other birds but no longer producing serious disease.

The average incubation period of fowl-paralysis is usually over two months. Natural infection appears to take place through the egg or by ingestion, the path of ingress presumably being through the mucous membrane of the alimentary canal. The fecal excretions would appear to convey infection during the incubation.

Western Duck Sickness is a form of food poisoning. Outbreaks of the disease are caused largely by environmental factors, such as inadequate water supply and fluctuating water levels. These conditions encourage the development of the causative organism of the disease, *Clostridium botulinum,* type C. This bacterium produces a food poison that causes the malady in birds that feed on infected materials.

The value of the milk flush (a feed containing 40% powdered milk for one to two days) in the diet of chickens may be due to its stimulating a rapid multiplication of certain bacterial organisms in the intestines of the bird and in the watery droppings which are voided following this feed. Some of the products resulting from rapid bacterial growth are toxic to at least some stages of coccidia.

Tests conducted at the Ohio Agricultural Experiment Station emphasize that it would seem to be extremely hazardous to brood chicks and grow pullets in confinement or in batteries if they are to be exposed later to disease or parasite contaminated soil or similar infections from other sources; that if chicks or pullets are to be exposed to contaminated soil or premises, the exposure should be as soon as possible after they are two weeks of age, so as to give them the opportunity to acquire resistance to the infections at an early age.

While veterinary medicine is a profession of vital economic importance, superior humane attributes and inherent dignity, it is also a business, the business of controlling animal disease and of making a living for those who practice it.

In an experiment at the National Institute of Poultry Husbandry, it was found that abnormal leg trouble or perosis occurred in chicks receiving an excessive amount of meat and bone meal, and rarely was manifested when the bone meal content of the ration was low or absent.

The average individual fowl is of relatively small value, but when birds are housed in large units, an outbreak of disease can be a ruinously expensive affair. In the diseases of poultry, as with the animals usually found on the farm, it is in prevention that the services of the veterinarian can become most valuable and esteemed.

To say that one had no training in poultry disease work at college is by no means an excuse, because whilst at college we were taught pathology and bacteriology and the prevention and cure of disease. Once this knowledge has been acquired it matters little whether the patient is a bird or a beast.—*Vet. Rec.* 13:48.

There are probably a number of causes all acting together or at times separately to produce watery white eggs. These are probably warmth, vibration or movement, storage or age of eggs, excessive porosity in a few cases, and probably the result of strain in hens towards the close of a heavy egg-laying period in a further number of cases.

In a report to *Science,* Menkin states that whereas animals without the iron salt treatment lived, on an average, 81.4 days after infection with tuberculosis, the average life span of the animals treated with the iron salt was 198 days, up to the time when two survivors of this latter group were sacrificed for examination.

Experiments show that the avian type of the tubercle bacillus frequently passes into the egg and reproductive organs of the spontaneously or artificially infected fowl.

* * * *

Filtrates prepared from the intestinal contents of lambs, sheep and horses, which died after an acute illness under circumstances suggestive of toxemia, have been shown to contain a toxin lethal to mice when injected intravenously.

* * * *

New business methods must be applied, not only for the pecuniary advantage of the veterinarian, but also so that he may work for his clients more economically. We are professional men in our own eyes but it is as business men that we deal with our farmer clients.

* * * *

Nothing leaves its taint behind so much as a procreative male with hereditary defects. In eugenic breeding the veterinarian has many advantages over his medical confreres, as the stud animals (except perhaps such night wanderers as cats) are usually under strict control.

* * * *

No animal is by nature dirty in its habits. In the case of puppies and kittens, as soon as they have done suckling, their mother licks them underneath and they then eject their feces and urine into her mouth. When they are old enough the parents take them out for little walks and when they are some distance away from their kennel they evacuate naturally.—*Vet. Rec.* 14:26.

* * * *

It is considered that the anthelmintic efficiency of copper sulphate for sheep may be due largely to its ability to pass in solution direct to the abomasum, in a high percentage of cases, and that the use of this solution as a vehicle may make possible the direct passage of other drugs to the abomasum, with a consequent increase in efficiency against such small or large bowel parasites as *Trichostrongylus spp, Oesophagostomum columbianum,* and *Chabertia ovina.*—*Aus. Vet. Jour.* 10:1.

Warwick has shown that scrotal hernia is inherited in a recessive manner, and dependent upon two pairs of genetic factors. The two most common kinds are scrotal or inguinal hernia, and umbilical or navel hernia.

* * * *

With the discovery in 1904 of the virus of swine fever, Salmonella infections of the pig have been relegated to the background. While for years Salmonella suipestifer has been considered as only a secondary or associated organism, it must now be realized that it may act independently of the virus, and in such cases the disease is in reality infectious necrotic enteritis.—*Vet. Jour.* 90:3.

* * * *

Canned green onions contain the pellagra-preventive factor, but in small amount. Canned lettuce leaves are poor in the pellagra-preventive factor. Lean pork shoulder is a good source of the pellagra-preventive factor. Peanut meal is a good source of the pellagra-preventive factor. The pellagra-preventive factor is equally as effective for black-tongue in dogs as it is for pellagra in man.

* * * *

The old saying "prevention is better than cure," applies particularly to anemia in young pigs. It is a preventable condition, and can be effected without cost, by allowing sows and their litters access to clean pasture land from the time the young pigs are ten days old until weaned. This practice is not new, but it is only recently that its significance in successful pig rearing has been appreciated. —*Vet. Jour.* 90:3.

* * * *

Bryan and Mallmann have found that living skin has an inherent ability to destroy bacteria when implanted upon the surface; that dessication plays an important rôle in the self-disinfection of the skin; that both a local and systemic residual germicidal action is imparted to the skin by irradiation with ultraviolet light, and that exposure to sunlight causes an increased killing action similar to that obtained by ultraviolet light irradiation.

The blood coming from the liver, where chemical changes are very active, is warmer than that of the general circulation.—*Bloodless Phlebotomist.*

The correct treatment for carbon-monoxide poisoning is to avoid giving all fluids, including water, and to produce body fluids by such methods as catharsis, lumbar puncture or bleeding.—*Phar. Adv.*

It is said that persons not receiving sufficient vitamin A in their diet have discharges from their nose and sinus passages similar to the discharges of the latter stages of a common cold.—*Bloodless Phlebotomist.*

Once lost, abundant good health rarely, if ever, is regained. The time to act, then, is when the precursors of disease alone are present. All such conditions of physical defects are discoverable if a suitable organization could be found to bring doctor and individual together in good season. Besides, many other maladjustments may be disclosed.—*Phar. Adv.*

While the increased resistance gained through heterologous experience is only relative, there is evidence which suggests that it may be sufficient to modify the course of subsequent infections and to be of some value in preventing certain diseases.—*Pub. Health Rept.* 48:22.

It has been estimated that nearly 50% of the losses in young pigs is directly or indirectly due to infestations of *Ascaris lumbricoides.* In practice it is found to be economically sound to treat young pigs regularly for worms.—*Vet. Jour.* 90:3.

Recently two incidents have added to the knowledge of vitamin C. Foremost is the discovery of the chemical nature of this organic food accessory. The other contribution is the development of an indirect chemical method for the estimation of ascorbic acid in foods and tissues.

Results of experiments with machine milking showed that chronic streptococcic mastitis is not more readily communicable by this method than by hand milking.

The production of milk which contains an abnormally large amount of lipase, and which consequently develops a bitter flavor, has been found to be associated with the late stages of lactation.—*Cor. Vet.* 24:2.

Seelemann stresses the futility of treating single cows in a mastitis herd, and recommends strongly that the practitioner always should endeavor to persuade the owner to have a laboratory test of the milk of every cow and follow this by segregation of affected animals in one or more sheds, and the adoption of hygienic measures. Treatment should be given only when this has been done.

It is evident that some changes do occur on pasteurizing cows' milk. These changes may be detrimental to the calf, but do not affect the suitability of such milk as food for man. The chemical composition of raw human, raw bovine, and pasteurized bovine milk shows that the changes caused by pasteurization, apart from lowering vitamin C content, are in the direction of making cows' milk a little less unlike human milk.

The spread of streptococcic mastitis in cattle cannot be associated with general hygiene, or the type of stall, but seems rather to depend upon the milker and his methods, and upon the degree of forcing for high yield. Vaccination is useless for curative purposes, whilst no conclusion can be drawn regarding its value in prevention.—*The Vet. Bul.* 4:2.

The so-called oxidized flavor is one of the most important and serious of the many problems which confront the milk industry at the present time. The tendency of cows to produce "sensitive" milk which readily develops the oxidized flavor appears to be largely limited to the winter months when the cows are consuming dry feeds. This suggests the probability that the food of the animal is important.—*Cor. Vet.* 24:2.

The agglutination test is a satisfactory means of detecting Brucella infection in a herd. One cannot, however, be guided by any given agglutination titre based on one test in establishing a line between the infected and non-infected.

* * * *

The great Baron Cuvier expressed the opinion that the dog exhibits the most complete and the most useful conquest that man has made. Each individual is entirely devoted to his master, adopts his manners, distinguishes and defends his property, and remains attached to him "even unto death," and all this springs not from mere necessity or from constraint, but simply from gratitude and pure friendship.

* * * *

For the purpose of supplying digestible protein, a given weight of alfalfa leaves is about 3½ times as efficient as the same weight of the more bulky alfalfa stems. The percentage of digestible nutrients is 14.87 per cent digestible crude protein, and 57.82 per cent total digestible nutrients in the leaves, and 4.17 per cent digestible crude protein, and 41.55 per cent digestible nutrients in the stem. When leaves are fed, 16.3 per cent of the nitrogen is stored, and when alfalfa stems are fed, 5.2 per cent of the nitrogen is stored.

* * * *

In most cases the lifeless carcass of a defunct hog that took the short, torturous detour via the hog cholera route, to the happy rooting ground, is an unsightly monument to the stupidity or carelessnss of the owner. In Maryland, records show that over 90% of the outbreaks of hog cholera are caused by improper feeding or management. The majority are caused by feeding the cholera-infected pork trimmings with the kitchen refuse and most of the rest by the unrestricted movement of cholera-sick hogs. Both man and his chattel, the hog, would have less trouble if more costless sanitation was used and less filthy foods and dirty quarters were given swine from baby pigs to profitable porkers.—Mark Welsh.

Infection of the udders of cows with *Brucella abortus* and the possible presence of the germs in the milk have received more attention during recent years than formerly because of the discovery that the organisms sometimes affect human health. Bang's disease is sometimes acquired by persons through the consumption of raw milk from cows infected with *Brucella abortus*. Butter made from raw cream produced by infected cows has been known to harbor abortion germs. Although the danger of contracting the disease through the use of dairy products from infected cows is relatively slight, it should not be ignored. Pasteurization, however, renders milk safe for human consumption.

* * * *

A few years ago the horse breeders of the country were far from optimistic. This was due largely to the increased use of tractors as a source of farm power. Figures from the United States Department of Agriculture show there were 27,819 tractors sold in the United States in 1916, 155,843 in 1927, and 99,820 in 1928. The number of horses on farms in the United States increased each year until 1918, when the number reached 21,550,000. The number has steadily decreased since that time and it is estimated that there were about 12,163,000 on January 1, 1933. This is a decrease of 44%. The mule population shows about the same trend. So, with the increase in the number of tractors and the decrease in the number of horses and mules, it is no wonder that many people thought that the horse and mule as a source of farm power were doomed, and largely discontinued horse breeding. The severe decline in farm incomes was met by farmers in many different ways. One of the methods has been to use the tractor less, and to turn back to horses as the chief source of farm power. This has caused an increased demand for work horses and a renewed interest in raising colts. In many places, the demand for suitable work horses is very good. Horse sales are well attended and high prices for the horses are reported.—Mich. Agric. Exp. Sta. *Quar. Bul.* 16(4) :224.

Achievements of Veterinarians

The people of the United States and Canada owe a greater debt for efficient service to the American veterinary profession than most of them fully appreciate. In guarding the public health, as members of boards of health, and in directing milk, live stock, and meat inspection, the profession has rendered an important and efficient service to the general public. In the control of live stock diseases communicable to man, American veterinarians have rendered a service unsurpassed anywhere.

And in the control of infectious diseases among live stock the American veterinarian has a record unequaled anywhere in the world for courageous and efficient public service. Contagious pleuro-pneumonia, which for years was the scourge of the live stock interests of the old world, was stamped out of American herds completely. Foot-and-mouth disease, which is still afflicting the herds of Europe and other countries, although it has found its way into this country on several occasions, has never been able to maintain its existence here because of the heroic and efficient methods of eradication employed by the American veterinarian. That scourge of the Southern cattle industry, the cattle fever tick, which a quarter of a century ago infested parts or all of fifteen Southern states, has been eradicated from 85 per cent of the vast territory in which it formerly did millions of dollars damage every year. Tuberculosis in cattle, the white plague of the human race, has been so effectively attacked by the veterinary profession of this country that there is evidence to prove that it is not over 30 per cent as prevalent as fifteen or twenty years ago.

These are but a few of the achievements of the American veterinary profession, in addition to the invaluable services it has rendered to our tremendous live stock interests in the routine treatment and control of diseased animals.—*Tait Butler.*

The Presence of Br. Abortus in the Uterine Fluid and in the Milk and of Agglutinins in the Blood Sera of So-Called Ceased Reactor Cows*

By B. A. BEACH and G. C. HUMPHREY,
Wisconsin Agricultural Experiment Station,
Madison, Wisconsin

THE literature on Bang's disease is voluminous. There seem, however, to have been relatively few observations on cows that have passed through outbreaks of the disease and either escaped infection or recovered therefrom. Rettger and White[1] conclude that "infection as indicated by serological tests is in the adult relatively constant." They report seven animals that reacted to the agglutination or complement fixation test or to both that ceased after a time to react. In a later paper White, Rettger and McAlpine[2] report on five animals that gave positive reactions, later becoming negative. Fitch, Boyd and Delez[3] report on one animal that became positive to both agglutination and complement fixation tests, later became negative then to return to positive. The animal was slaughtered because of sterility; hence her final status as regards serological reactions was not determined.

All of the observations that have come to our attention have been on herds in which the infection had existed for some time. In such herds there is seldom any change from positive to negative. Those positive animals that go negative usually do so during the first year after the initial infection. Rettger and White[1] believe that positive-reacting cows are apt to become negative at or near the time of calving or aborting. After three or four weeks such animals react positively again.

The Experimental Herd

Fourteen cows were under observation. They had been part of a herd of 44 animals in which *Br. abortus* infection had been artificially induced.[4] Two of the fourteen evidently escaped infection, for they neither reacted nor aborted. The other twelve reacted in varying degrees but all were considered positive. Four of them reacted in no higher than the 1-50 dilution, one in 1-100, four in 1-200, and three in 1-400 dilutions. Eight weeks was the longest any of the animals was as high as 1-400. The titre of these animals returned to negative or nearly so. Observations were made through two years and a total of 27 pregnancies.

Procedure

At the time of calving colostrum milk from each quarter and uterine fluid were taken. The milk was centrifuged and the cream and sediment from each quarter injected intraperitoneally into guinea pigs. The uterine fluid was likewise injected into these test animals. Eight weeks later the guinea pigs were slaughtered and their blood tested for the presence of agglutinins. Any showing titre were cultured.

With one exception Brucella was not demonstrated, showing that thirteen of the fourteen animals were probably not eliminating the organisms. The exception was Cow No. 36. This cow freshened October 30, 1932. The left rear quarter was found to harbor Brucella. This infection was evidently transitory, as shown by the fact that during two subsequent pregnancies the animal was negative. This cow was slaughtered March 27, 1934, at which time the udder, supermammary lymph gland and uterus were searched carefully, both by guinea pig inoculation and cultural methods, with negative results.

*Published with the approval of the Director of the Wisconsin Experiment Station.

Agglutinins for Brucella in the Blood Sera

These cows were tested monthly by the rapid agglutination test. The antigen was prepared in the usual manner and contained 18-22 per cent packed cells (Fitch centrifuge tube method). In the accompanying table is set forth the results for the two-year period. Complete agglutination in 1-50 dilution is considered a positive reaction. It will be noted that eight of the fourteen revealed titre enough to be considered reactors at some time during the two-year period. All but three, however, were either negative, or at the most gave suspicious reactions, most of the time. It is evident that these animals were carrying a low antibody concentration in their blood. Further proof of this was found in the fact that the colostrum milk serum from all twelve cows reacted 1-400 or higher. After two to three days the milk serum had lost most of its titre. The monthly testing of these animals revealed considerable fluctuation in the antibody content of the blood. Whether this was actually the case, or our methods of detection were inaccurate enough to permit of such variation our investigations did not reveal.

RESULTS OF RAPID AGGLUTINATION TEST ON 14 SO-CALLED CEASED REACTORS FOR TWO YEARS

Cow No.	4	38	44	28	40	36	18	12	8	17	5	31	33	35
1931-32:														
Aug.							t				*			
Sep.													P	+t
Oct.		+P		Pt		Pt		PP	PPt		Pt		PPt	Pt
Nov.		++P		Pt		++P		PP	+P	Pt		t	+Pt	++Pt
Dec.		+Pt		Pt		*		+P	+Pt	P			Pt	++t *
Jan.		+Pt	*	Pt				Pt	Pt	t	t		Pt *	+P
Feb.		Pt		Pt				*	Pt	t	+t		++Pt	+Pt
Mar.		Pt		Pt				Pt	*		+Pt		+++P	+P
Apr.		+P		+		+			t		Pt		+P	+P
May.		++Pt *		+Pt	*	+Pt	*	Pt	t		+P	*	++P	+Pt
June.		+Pt		t *				++P		*	+P		+Pt	++Pt
1932-33:														
July.	*	+Pt		+t				Pt	tt		Pt		+++Pt	++Pt
Aug.		+Pt		t				P	Pt				+Pt	++Pt
Sep.		Pt		t		t		Pt	t	t	t		Pt	Pt
Oct.		+Pt		t	t	t *	t	t	t	t	P	t	+t	Pt
Nov.		+Pt		t		t		Pt	t		P		+Pt	+P *
Dec.		+P	*	+P		t		t *	t	t	P		Pt *	PP
Jan.		+Pt		Pt		t		Pt	P		Pt		PPt	+Pt
Feb.		+P				t		Pt	Pt		Pt		PPt	Pt
Mar.		Ptt	t		*	PP			Pt				+Pt	+Pt
Apr.		Pt *		Pt		t		t	t		+			Pt
May.	*			*					*			*	Pt	Pt
June.		Pt		t		+Pt	Pt	t	Pt	*			Pt	PPt
1933-34:														
July.		Pt				PP		Pt	Pt				Pt	+Pt
Aug.		Pt	Pt	Pt	Pt	P	*	Pt		t	Pt		Pt	+Pt

*Indicates the month in which calving took place.
Note: Dilutions from 1-25 to 1-400.

Discussion

1. Fourteen cows that passed through an outbreak of Bang's disease were held for observation for two years.

2. Eleven of them were negative, or at most suspicious, during this period. Three at times were low reactors.

3. The colostrum milk and uterine fluid failed to reveal *Br. abortus* with the exception of one cow in one quarter of the udder at one freshening only.

4. The colostrum milk serum showed

antibody concentration of 1-400 or higher. After the animals had been milked a few days the titre had largely disappeared. This shows an antibody concentration in the udder during the non-lactating period.

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[1]Rettger, L. F.; and White, G. C. 1918. Conn. Agr. Exp. Sta. Bul. 93.
[2]White, Rettger, and McAlpine. 1924. Conn. Agr. Exp. Sta. Bul. 123.
[3]Fitch, Boyd and Delez. *J. Am. Vet. Med. Assn.*, N. S. 28, No. 2, p. 215.
[4]Hart, E. B.; Hadley, F. B.; and Humphrey, G. C. 1932. Wis. Agr. Exp. Sta. Res. Bul. 112.

Observations on the Reinfection with Br. Abortus of Part of a Dairy Herd That Had Been Infected Five Years Previously*

By B. A. BEACH and G. C. HUMPHREY,
Wisconsin Agricultural Experiment Station,
Madison, Wisconsin

TO DETERMINE whether cows that had passed through an outbreak of Bang's disease were subsequently susceptible, the experiment herein described was consummated. The thirteen cattle herein discussed are, with the exception of cow No. 18, the ceased reactors described under the title of "The Presence of *Br. Abortus* in the Uterine Fluid and in the Milk and Agglutinins in the Blood Sera of So-Called Ceased Reactors," in the preceding article. Cow No. 18 was removed from the herd just previous to infection because of well-advanced pregnancy. It was our aim to infect at as near 60 days pregnant as possible.

Quartered with these animals were twenty-two cows that had not previously been exposed to Brucella infection. Eleven of these aborted. This indicates that the artificial infection to which this herd was exposed was adequate and that abundant exposure was afforded all animals in the herd.

Mode of Infection

September 5, 1933, two drops, approximately .03cc each, of a suspension of three pooled cultures were deposited in the eye. The two drops contained 6,500,000 organisms as shown by the dilution plate method. These cultures were virulent for guinea pigs. A young cow from a Bang's disease infected herd that had recently aborted was added to this group. Bacteriological and guinea pig injection showed this cow was eliminating *Br. abortus*. This addition was made to afford contact exposure.

On September 15, 1933, each cow was fed 60cc material prepared by diluting one fetal stomach contents to 2000cc. *Br. abortus* was present as shown by both cultural methods and guinea pig injection. At the time of infection the blood titre of these animals was negative or suspicious. With one exception the agglutination reaction was much the same following reinfection as it was before.

The exception was cow No. 5. This cow produced normal calves and was a suspicious reactor following the initial infection in 1928. Her reaction remained either negative or suspicious until after the reinfection which, as stated above, took place on September 5 and 15, 1933. On October 4 she was partial in 1-25 and 1-50 dilutions and showed a trace in the 1-100 dilution. On November 1 she was plus in 1-25 and partial in 1-50. On November 16 she was plus in 1-400 dilution. On November 9, 1933, she aborted, and *Br. abortus* was recovered from the uterine fluid and the fetal stomach contents. Why this animal was apparently resistant to the infection in 1928 and highly susceptible in 1933 was not determined. This cow was killed in January, 1934. She had been losing flesh ever since she aborted in November. The only pathological lesion of note was a degeneration of the kidneys. They contained considerable pus.

*Published with the approval of the Director of the Wisconsin Agricultural Experiment Station.

In the accompanying table will be found the blood reactions and calving or aborting dates. It will be noted that the reinfection had little influence on these cows as far as the blood reactions and reproduction are concerned.

Results of Post Mortem Examination

These cows were all slaughtered. Each quarter of the udder, the body of the uterus, and the supermammary lymph glands were cultured on gentian violet agar, and an emulsion of the tissue injected into guinea pigs. Cow No. 5 as noted above was killed in January. The udder was positive for Brucella, supermammary lymph glands and uterus negative. Cow No. 36 because of an accident was killed in March, 1934, and the remainder of the animals were slaughtered from May to August, 1934. Both bacteriological and guinea pig inoculations, with the exception of Cow No. 5 noted above, were negative for all of these animals.

AGGLUTINATION REACTIONS OF A DAIRY HERD FOLLOWING BRUCELLA INFECTION

Dates of Infection: Sept. 5 and 15, 1933 Dilutions used: 1-25, 1-50, 1-100, 1-200, 1-400

Cow No.	1933					1934						
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July
4										*		
38	Pt		Pt	Pt	++PP	+Ptt	+Pt	+Pt	+++Pt	+++Pt	++Pt	++Pt
44	Pt			t	tt	tt	t	t *	t	t		
28	Pt	t	tt	+Pt	+PPt	+Pt	t	Pt	Pt *	Pt		
40	Pt		t	Pt	tt	tt	t	tt *	Pt	Pt	t	tt
36	P			+	++PP	Pt	t	*				
12	Pt	t		t	+Pt	PPt	t	Pt *	+P	t		PS
8				t	tt	Ptt		t			P	SS
17	t	t	Pt	+Pt	+Ptt	tt				*		+
5	Pt	t	+++++	+++++a								
31								*				
33	Pt	t	Pt	Pt	PPP	Ptt	Pt	Pt *	P			
35	Pt	Pt	Pt	Pt	+Pt	Pt	Pt	Pt	Pt *	Pt	Pt	Pt

*Indicates calving date. a Indicates aborting date.

Discussion

Reinfection with *Br. abortus* with one exception had little effect on the 13 cows in this herd. In no instance did a cow that aborted following initial infection abort on reinfection. The agglutinin titre of the blood with the exception of Cow No. 5 was only slightly influenced, in spite of the fact that 11 of 22 stable mates aborted.

A Practitioner's Viewpoint on Contagious Abortion in Cattle

At present, we hear much regarding undulant fever, blood testing and abortion control. The point is, what are we going to do about it? How many herds can have the test applied in a practical way? I would say, roughly, 20%. For the other 80%, which includes those of the average dairy farmer, I believe it to be out of the question.

From my experience with the test, and I have tested thousands of animals, it can be used as a guide and in that way be of much help to us, but it is not definite enough to be acted upon in the average commercial herd. Many things may affect a test that we as yet know little about. Many animals that are positive become negative, and so remain. Negative cows abort in many instances, and plenty of positive cows never abort and are good producers. Slaughtering valuable breeding animals just because they are positive to a blood test is, in my opinion, an unwise procedure, as they have a fair chance of becoming negative.

THE blood testing of cattle has been pretty much of a rich man's hobby in my locality so far. It has been advertised, talked about and legislated upon by and for the

The 'Little Red'

In this one-room cottage at Saranac Lake, N. Y., called "Little Red," the modern treatment of tuberculosis began in 1885 because Dr. E. L. Trudeau discovered the value of rest in curing tuberculosis » » Progress has been made in the fight against tuberculosis, but it still kills more persons between 15 and 45 than any other disease » » Help conquer it by using Christmas Seals on your holiday letters and packages.

The National, State *and* Local Tuberculosis Associations *of the* United States

BUY CHRISTMAS SEALS

man who keeps a herd as a plaything—a herd economically always in the red. There are exceptions, of course, but pick up any agricultural or breeders' journal and note in every issue the dispersals of just such herds. Hundreds of them have gone out of existence in the last few years. Such herds comprise only a small minority of the dairy cattle of the country.

The backbone of the dairy industry is the man that makes his herd give a fair accounting of itself, even if marketing conditions are very much against him, as at present. This is the man that the veterinarian has to advise as well as his wealthier clients, and what have we to offer this individual? We cannot outline a prohibitive treatment like constant blood testing, isolation, etc., but it is better to tell him to go out of business.

What has he to gain by a negative herd after he gets it, if he survives the ordeal? On the average farm such a herd is dynamite, because those animals have no resistance to the infection and, if a break occurs, and probably will under average dairy farm conditions, the owner is in for a lot of trouble. The practical thing is to vaccinate such herds. This has been my advice to clients for 15 years and the results have been good. I have yet to find the herd that I could not put on a sound breeding basis with the careful use of a good vaccine. I vaccinate all animals in the herd at the proper time, until all cows have had at least one dose. My experience has been that one 20cc dose is usually enough. Then vaccinate all unbred heifers every year and in this way build up a resistant herd that will not require impractical means to keep it healthy.

PRACTICALLY every animal that is negative before being treated with vaccine will, in a few months, become negative again and remain so. Also many of the positive cows, even those that have aborted, will in time become negative, and even if a certain percentage do not, they go on breeding regularly and do not spread trouble. If a negative herd is wanted, build it up from immune animals and in this way avoid the awful abortion breaks which we so often see. With a protected herd, the owner need not die of fright if some stray dog drags an aborted fetus into the pasture or if a neighbor's cow gets into his enclosures. It is not necessary to guard the barn with a shotgun to keep visitors—buyers, inspectors, etc.—out.

I believe much damage has been done to the dairy industry by unfair state regulations that affect the sale of reacting cattle. What is the owner of an average herd to do for replacements if only negative, highly susceptible animals can be purchased?

It is time the veterinarians asserted themselves and made it clear to the cattle owners that such regulations work to their disadvantage and should be replaced by sensible ones. If we had more practical men who have had field experience in our animal industry departments, I believe we would have less nonsensical regulations. With no two states having the same regulations governing the shipment of cattle, it is high time some uniform Federal regulation was put into effect.

Eugene O. Brielman.

Pittsfield, Mass.

Cheap Dog Food a Delusion

By JOHN W. PATTON,
East Lansing, Michigan.

IN THE main, canned dog foods retail at 6c, 8c or 10c per can. The 6c can is purchased because it is cheap. Actually, the food in the 6c can costs nearly twelve times as much per unit of nutritive value as does the food in the 10c can, and six times as much as that in the 8c can.

THE fixed costs that any can of dog food must carry, regardless of its retail price, are shown in Table No. 1. The variable costs that must, of necessity, account for the difference in the retail price are shown in Table No. 2. It is thus shown that the maximum food value, the part used by the purchaser, in the 6c can, can be only one-third of 1c; in the 8c can, it may be six times as much, or 2c; and in the 10c can, an allowance for food is possible of 3 5/6c or approximately twice that of the 8c can and nearly twelve times that of the 6c can.

TABLE NO. 1. FIXED COST OF ANY CAN OF DOG FOOD.

Can (No. 1)	1.726 cents
Freight and handling	0.274
Label	0.125
Carton	0.252
Labeling, packaging, etc.	0.350
Filling, cooking, sterilizing, etc.	0.750
Selling costs	0.250
Transportation (300 miles)	0.510
Overhead	0.600
Manufacturer's profit	0.333
Total	5.17 cents

TABLE NO. 2. COSTS VARYING WITH PRICE OF THE CAN.

	6c Can	8c Can	10c Can
Fixed costs	5.17c	5.17c	5.17c
Retailer's gross profit	0.50c	0.83c	1.00c
Contents	0.33c	2.00c	3.83c
Retail price	6c	8c	10c

THE costs termed "fixed" in the tables are such only in that they are inescapable. There may be a variation in their proportions. Thus, the "freight" on the cans will vary with the distance of the canning plant from the source of supply; "transportation" will vary with the area over which the food is distributed; "overhead" naturally varies from plant to plant, and so may "selling costs," etc. But, on the whole, the costs in the groups as given are approximately minimal—many plants will exceed them; few, if any, have a lower "fixed" cost.

ON A percentage calculation, also, the 6c can of dog food is uneconomical and its purchase wasteful. Thus, the dog gets but 6% of the money his owner spends for a 6c can and 94% of the purchase price is uneaten; he gets 25% of the money expended for a 8c can and only 75% is discarded; he gets aproximately 40% of that expended for a 10c can, which compares favorably with the cost of the food in canned fruit or vegetables, bottled milk or other packaged foods.

VERILY, cheap dog food is both a delusion and a snare; a delusion for the owner of the dog and a snare for the dog, and both suffer from it as does also the retailer, whose margin of profit for handling it is inadequate. The manufacturer, alone, profits and he in no greater degree than in putting up a can of good food.

OF COURSE, it does not follow that every can of dog food that retails for 8c, has 2c of food value in it, nor that every can that retails for 10c has approximately 4c of food value in it; but it is possible for it to contain these amounts if manufactured by an honest manufacturer whose cost of selling is not too high, and who puts inside of the can, the maximum food value permitted by the limitations of costs and retail price; but no manufacturer, however good his intentions, can put anything of food value worth considering into the 6c can unless he be a philanthropist supported by an endowment.

TO EXPECT something of food value in the 6c can of dog food is to expect something for nothing, and to place oneself in that class, of which it is said: "There is one born every minute."

Contagious Feline Enteritis— A Virus Disease

By HENRY J. APPLE, M.Sc., and ELLA L. ACKERMANN, M.Sc., Ph.D., Columbus, Ohio

The Problem.—In the autumn of 1933 an outbreak of "cat enteritis" in Columbus brought to light the extremely small amount of knowledge the veterinarians possessed concerning such a common disease whose mortality is practically 100%. This is probably due to the fact that few veterinarians encourage feline practice because: (1) they have a natural dislike for cats, (2) difficulty in restraining, (3) difficulty in the administration of drugs, (4) drug idiosyncrasies, (5) lack of first hand knowledge concerning feline habits, peculiarities and diseases.

The high mortality of young stock has made "cat enteritis" an acute problem with cat breeders. The authors have conducted experiments on a small scale with "cat enteritis" since 1933. The results agree with the results reported in this paper.

The bibliography is not extensive. An attempt has been made to keep it small, since serious research has been done only in the last few years. To include those works that antedate 1928 would only confuse without adding anything to our present knowledge.

Literature—1928-1934.—Previous to 1928 various investigators had isolated organisms from the lesions of enteritis in cats but in the light of recent investigations these have been proved to be only secondary invaders. The primary cause was first pointed to in 1928 by Verge and Cristoforoni[1] who concluded that "Cat gastro-enteritis" is due to a filterable virus. These men were able to reproduce the disease in other cats by means of filtrates of various diseased organs.

Blount[2] 1930, states that one of the most striking features in "gastritis" is the fact that the animal will drink large quantities of water only to vomit it up in a short while. Advancing the theory that lymph action repairs an inflammation on the intestinal mucosa he took all food from the animals and used salt to wash the highly inflamed surfaces. The following isotonic solution was used. It is similar to the blood plasma and Blount reports that it has also proved successful in treating several cases of "hemorrhagic gastro-enteritis."

Rx

Sodium chloride	40.0 grs.
Potassium chloride	1.9
Calcium chloride	1.0 gr.
Sodium bi-carbonate	7/10 grs.
Neutral sodium phosphate	1.0 gr.
Glucose	5.0 grs.
Water	10.0 ounces

M. et F. Solut.

Signa: Give one to two ounces of warm solution.

In 1931, Kirk[3] reported a case of "hemorrhagic enteritis" which he treated by injecting subcutaneously every twelve hours 9 ounces of physiological saline and glucose solution (see above formula) at blood heat. One ounce was given per os. Then every three days he gave 1cc of hemorrhagic septicemia vaccine until three doses had been given. The cat made a complete recovery by the tenth day.

Another treatment advanced by recent research workers is that of formalin and Congo red. This was reported by Kok[4]. He was able to obtain satisfactory results by treating "cat enteritis" with intravenous injections of formalin or Congo red. After careful tests he determined the toxicity of formalin and Congo red for various animals.[5] A 40% solution of formalin is preferred, the dose being three to four drops in solution with 4cc of physiological serum. The dose of Congo red advised is 5cc of a 1% aqueous solution.

Hindle and Findlay[6] have considered "cat enteritis" as an abdominal form of "feline distemper." In some 300 cases certain pathological changes were noted. In some por-

tion of the small intestine there was always a catarrhal congestion of the mucous membranes. From small patches on the ileum this congestion was found to range to the entire small intestine and only in exceptional cases did it extend to the large intestine and stomach. The mesenteric and posterior lymph nodes were enlarged and congested. Often the congestion was found in the lungs or the spleen was enlarged. Pleurisy, with effusion, peritonitis, and three cases of hemorrhagic thymus were noted.

Histological examination showed that in the early stages there is found only a congestion of the submucosal capillaries. Later stages vary from hemorrhage to sloughing and destruction of the mucous membrane. The lymph may be hemorrhagic, while the lungs are sometimes congested, the alveoli often containing a fibrinous exudate. The spleen, liver and kidneys showed no definite changes. The following are the clinical symptoms which these authors note:

1. Some die with no definite symptoms.
2. Some have diarrhea, and discharge from the eyes and nose.
3. Some have a temperature of 103-105° F.
4. Some have no significant rise in temperature.

Such variable clinical symptoms offer no method for certain clinical diagnosis.

The variety of bacteria plated out included: *B* coli 7%, a motile gram-negative bacilli of the Salmonella group 50%, hemolytic streptococcus 37%, *Bacillus bronchisepticus* 15%, Pasturella group, hemophilic bacteria 9%, Streptothrix, Staphylococci.[7] These secondary organisms shed no light on an etiological factor in the disease, which according to Hindle and Findlay is due to a filterable virus. They have been able to transmit the disease by fomites, nasal wash, spleen and abdominal lymph filtrates.

These men were able to preserve the virus in 50% glycerine. In order to attenuate the virus they dried the spleen and mesenteric lymph glands in a vacuum at room temperature, in a dessicator containing pentoxyde of phosphorus (P^2O^5). After keeping the dried substance for 19 days at the room temperature they emulsified it in saline solution and filtered. The filtrate was then inoculated in two kittens. At the end of twelve days one of the kittens was sprayed with a contaminated nasal wash, two days later another was sprayed. Except for a slight fever, neither kitten showed signs of apparent illness.

Kirk[8], in commenting on the above work by Hindle and Findlay, states that other clinical distemper symptoms are coryza, rhinitis, sneezing and salivation.

One of the most outstanding pieces of research on "feline enteritis" has been done by Urbain[9] and his colleagues, Lassablière, Voignier and Bullier.

These men also found the regular secondary invaders in their bacterial examination and confirmed the work of Verge and Cristoforoni in that they found a filterable virus capable of reproducing the disease in other cats. After making sterile filtrates from aseptic heart blood, spleen, liver, kidneys, brain and mesenteric ganglion they made injections into two-month-old kittens. Those receiving 4cc of the blood filtrate became depressed, had no appetite and vomited. They died on the eighth day. Four cc of the spleen was injected into some of the kittens and 4cc of mesenteric ganglion filtrate was injected into others. These animals vomited and had a diarrhea and died on the tenth day. All the animals receiving the liver, kidney and brain filtrates recovered. Subcutaneous, abdominal, cerebral and veinous injections were given. Saliva, urine and feces were found capable of reproducing the disease which killed the test animal.

They report that the active virus will retain its virulency 35-50 days if preserved in glycerine 50% and kept in a refrigerator. However, it will remain virulent only 4 to 5 days if preserved in milk or saliva solution. When the virus was dried in a sulphuric vacuum or P^2O^5 it was discovered that the blood remained virulent only 56 hours while the spleen was virulent for 4 to 5 days. This prompted an investigation concerning the relation between the temperature and loss of virulency. They reported

that at 37°C. the virus lost its virulence in 48 hours, at 56°C. in ½ hour and at 100° C. in one minute.

In the hope of finding some similarity between "infectious gastro-enteritis" and typhus of the carnivorous animals in the zoo, they investigated the latter disease carefully. Typhus is characterized by inappetence, vomiting, and green-yellow diarrhea. The temperature rises to 41° (105.8°F.) and falls quickly to 36° (96.8°F.). The animals die in 12 to 18 hours. Filtrates of various organs were made and injected into a number of animals, including cats, but there were no fatal results.

Interested in combating this typically feline disease they set about making a vaccine in the following manner. A freshly dead aseptic spleen was weighed and crushed in a sterile mortar and pestle with sterile sand. This was then emulsified in saline solution using one gram to 10cc of liquid. Commercial formalin was then added in the proportion of two parts per 1000. This was left for 48 hours at room temperature, then tested for sterility and placed in 2cc ampoules and put in a refrigerator.

When 2cc of this vaccine was injected subcutaneously there was no reaction except a slight redness and a little edema at the point of injection. This soon disappeared. One of the controlled experiments to test the immunizing qualities of the vaccine was to inject four cats, giving each 2cc and five days later giving another 2cc. These cats were then fed for two days on food which had been contaminated by saliva, urine and feces of sick cats. The vaccinated cats remained normal while the control cats died in 18 hours.

In May 1934 Lombard[10] reported his conclusions on "infectious gastro-enteritis." Of the 22 cats studied 21 showed lesions typical of active pulmonary congestion. He found that there was not ordinarily a gastro-intestinal congestion but there was acute gastric or acute enteritic or acute gastro-enteritis of a catarrhal type. In only a single case did he observe a hemorrhagic enteritis. Intestinal lesions were found only in the small intestine, particularly in the jejunum or ileum. It is interesting to note that of these 22 cats five were Siamese. There were 11 males and 11 females. The ages ranged from three months to two years, the average was six months.

The most recent report on "Infectious enteritis" is by Leasure, Lienhardt and Taberner of Kansas State College.[11] These men report that the virus is present in the brain, spleen, kidneys, urine, feces and blood. The following microorganisms or secondary invaders were isolated. *Escherichia coli,* a gram negative rod (Salmonella) *Staphylococcus alba, Pasteurella feliseptica, Streptococcus hemolyticus,* and a gram positive rod. The heart was sterile. These organisms had no effect when injected into susceptible cats. An initial rise in temperature, inappetence, depressed attitude, emaciation and excessive diarrhea were found to constitute the most constant symptoms.

Lesions varying from a simple congestion to an extensive pseudo-membranous enteritis with congestion were most common in the ileum. It is interesting to know that 90% of the cases examined were infested with hookworms, while a large majority had round worms. Constipation was never observed. Liver, spleen and kidneys were slightly swollen and congested. Microscopically, the most outstanding characteristic of the lesion in the small intestine was the absence of discharged leucocytes. Extensive hemorrhage was noted in the follicles of the spleen and the blood vessels were highly congested. The kidneys showed an acute hemorrhagic degenerative nephritis. The lymph nodes revealed small areas of congestion, hemorrhage and extensive serous infiltration. These men advanced the theory of an acquired immunity through a natural infection and prenatal or colostric immunity.

Three possible methods of immunization were investigated. (1) Formalized tissue vaccines. These vaccines were made similar to the Urbain method and were found to immunize susceptible animals quite successfully. (2) Hyperimmunized homologous anti-serum and virulent virus, proved highly immunizing. Five to ten cubic centimeters

of the serum were given simultaneously with three to five cubic centimeters of virus. This was administered subcutaneously and the animals remained healthy, while the controls died. (3) Immunizing with virus filtrate and heterologous (mule) anti-serum, was only partially successful; 33% died while 66% were apparently immune, of these 50% developed abscesses. It is the authors' opinion that this particular phase of the experiment should be repeated.

The following synonyms have been encountered for "cat enteritis": Cat gastro-enteritis, gastritis, hemorrhagic enteritis, cat enteritis, feline distemper, cat malady, show fever, feline enteritis, infectious gastro-enteritis, typhus, feline infectious enteritis, epizootic enteritis, croupous enteritis and cat plague.

Dorland's Medical Dictionary[12] defines enteritis as an "inflammation of the intestine, chiefly of the small intestine," while gastritis is an "inflammation of the stomach." Therefore gastro-enteritis is an "inflammation of the stomach and intestines." From the above accepted definitions, the disease which we have been discussing, should be called *enteritis,* since the center of inflammation is the ileum or jejunum.

By an infectious disease, we mean one that is "liable to be communicated by infection." It is caused by parasites and may or may not be contagious. A contagious disease, on the other hand, is one "propagated by contagion." That is a disease by direct or indirect contact or by effluvia. From the history and mode of transmission of this disease, it should be labeled *contagious.* Moreover it is contagious *feline* enteritis, since it is specific for felines.

So that our data on contagious feline enteritis might be complete to November, 1934, we have contacted the leading veterinary research and biological laboratories in the United States.[13] We found only one company doing research work on the virus and its control. As yet they do not know whether they will market a tissue vaccine or a homologous serum.

Research has already proved definitely that contagious feline enteritis is a virus disease. Moreover it has been definitely proved that the tissue vaccine is one means of immunizing against this dreadful disease which seeps through catteries, killing thousands of dollars worth of fine show cats every year. Monologous anti-serum with the virus is another means of immunization. The cat breeders and the few cat specialists in the United States would welcome some action on the part of the Federal Bureau of Animal Industry, regarding this very critical problem.

Summary

1. Contagious feline enteritis research has yielded definite results in the last six years.
2. Contagious feline enteritis has been definitely proved to be a virus disease.
3. Contagious feline enteritis has been definitely proved to be specific for felines.
4. The course of the disease is acute or peracute.
5. Mortality in 80% of the cases is within 48 hours.
5. Symptoms are:
   a. Initial high temperature usually dropping to a subnormal temperature.
   b. Loss of appetite.
   c. Vomition—often bile stained.
   d. Marked depression.
   e. Diarrhea in the more chronic cases.
   f. Incubation period artificially induced varies from twelve hours to six days.
   g. Incubation period from natural infection varies from four to ten days.
   h. Skin is lacking in tone.
   i. Rough hair coat.
   j. Facial expression assumes a "whipped-dog" look.
   k. Extremities cold.
   l. The animals hang over water. Emesis usually follows drinking.

7. Pathology is typical of a virus disease in that there are seldom definite lesions, although there is usually an inflammation of some portion of the small intestine. The lesions are:
   a. Muscles and skin dehydrated.
   b. Inflammation of the intestines varies from simple congestion to necrotic.

c. Lesions were most contant in the ileum.

d. Enlarged mesenteric lymph glands.

e. Occasional petechial hemorrhages of the abdominal viscera.

f. In chronic cases there is usually a congestion of the lungs, spleen, liver and kidneys.

8. Etiology:

a. Cause is a virus.

b. Various microorganisms have been isolated: *Pasturella feliseptica,* (bipolar organisms), hemolytic streptococci, *Escherichia coli,* Salmonella, Staphyloccocci, *B. bronchisepticus, B. paratyphosus.*

c. These organisms are considered as secondary invaders, since they are not capable of reproducing the disease.

d. The disease may be spread by direct or indirect contact; by saliva, urine or feces.

9. Immunology.

a. Young cats are more susceptible than old cats.

b. Very young cats are often found to to be immune. This may be attributed to an immunity acquired from the mother or to a natural infection.

c. Immunization follows one attack.

d. Immunization may be conferred by formalized tissue vaccines or by homologous anti-serum and virus.

e. Heterologous anti-serum and virus has not proved entirely satisfactory.

f. Laboratory animals are immune.

10. Treatment.

a. Palliative.

b. Anti-serum against secondary invaders.

c. Homologous anti-serum.

11. Contagious feline enteritis is a name more in keeping with the characteristics of the disease than others in common use.

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Parke, Davis & Company, Detroit, Mich.
Pitman-Moore Company, Indianapolis, Ind.

Lavage and Gavage in Dog and Cat Practice

By J. GILBERT HORNING,
Houston, Texas

(*Concluded from last month*)

PART 4

Anatomy and Physiology of Esophagus, Stomach and Duodenum—Gastric Function.

It is my opinion that anatomy and physiology should be taught as interrelated subjects with reference to their subsequent clinical application. The study should largely be of the living animal rather than of the dissecting subject. This should be far more interesting to the student and lead to a better knowledge for use in clinical work.

The Esophagus.—The esophagus connects the pharynx to the stomach and is a rather wide, easily dilatable muscular tube, which spreads in an extensive design in the cervical and thoracic regions. It bends from the left side of the trachea to the entrance of the chest and takes up again its middle position. In the thoracic cavity it is crossed on the left by the posterior aorta and itself crosses on the right the left bronchus (see Figs. 4 and 5).

Four strictures occur in the esophagus due to the compression related organs exercise upon it. From the front to the back one finds a cricoidian stricture (isthmus esophagi), situated at the beginning of the esophagus back of the cricoid; an aortic stricture at the point where the posterior aorta crosses the esophagus; a bronchial stricture due to the compression by the left bronchus, and finally a diaphragmatic stricture at the point where the esophagus passes through the diaphragm.

The alimentary bolus is discharged by the pharynx and received by the esophagus and pushed by contraction of its muscular fibers in rhythmic waves, into the stomach.

The stoppage of foreign bodies in the esophagus occurs most frequently in the superior and inferior sphincter regions. When it occurs in the middle portion it is generally at the crossing of the posterior aorta.

The Structural Character of the Esophagus is similar to that of the pharynx, and consists from within outward of the following coats or tissue layers: (1) The Mucosa which has a surface epithelium and underlying stroma or tunica propria, a narrow muscular band, the muscularis mucosa, separates this from the submucosa. (2) The Submucosa a strong, loosely arranged fibrous and elastic tissue coat that forms an excellent pliable layer for the mucous glands and lymphatics and for nerves and blood vessels to spread in before they branch off to supply the mucosa. (3) The Muscular Coats consist of two layers of spiral (striated) fibers which cross each other and make up the entire musculature of the esophagus to near the cardia where they become longitudinal and circular (smooth) fibers continuous with those of the stomach. (4) The Fibrous Coat serves to connect the esophagus with the surrounding parts and is composed of white fibrous tissue and elastic fibers.

Nerves.—The upper part of the esophagus composed of striated muscles is controlled by the vagus; the lower part, composed of smooth muscle fibers, contains throughout an intrinsic ganglionated plexus and in this respect resembles the walls of the stomach and intestines. This system of enervation gives it the power of autonomic activity. The lower part is affected by hunger stimuli also and has hunger contractions the same as the stomach, especially when the contractions of the latter are at their height. Insensitive to tactile stimulation and mineral acids, the esophagus is extremely sensitive to thermic stimuli, which are conveyed to the central nervous system by the vagus and not by the sympathetic nerves.

The Blood Supply.—Arterial blood reaches the esophagus from the left common

carotid, from the gastric and the esophageal branches of the thoracic aorta and from the broncho-esophageal, which is also a branch of this artery. The esophageal veins pour their blood into the systemic circulation through the azygos veins, and form an anastomosis also with the gastric veins which empty into the portal system.

The Function of the Esophagus is to convey food from the pharynx to the stomach. As the passage of the food bolus is discharged into the esophagus there is a sensory nerve impulse directed to the high nerve center which creates as an efferent reflex a succession of peristaltic contractions that move the bolus on to the lower part where there is a further contraction of the esophagus that has been anticipated by a relaxation of the cardia, permitting instant reception by the stomach. The periodic relaxation of the cardia allows repeated regurgitation of the stomach contents into the lower reaches of the esophagus and even higher, but this is quickly returned by peristaltic waves.

The Stomach.—The stomach of the dog and cat is divided into two compartments by a well defined sphincter development called the "incisura angularius." The left cardiac compartment used for the reception and digestion of food is called the "saccus digestorius" and the right pyloric compartment acting as the motor or ejaculatory portion is termed the "canalis egustorius."

The saccus digestorius is large and rounded and consists of a left extremity or fundus that is usually filled with air (the magenblasse); this goes to a descending ventricle composing the main body of the organ, termed the "tubus gastricus" or "corpus ventriculi." The canalis egustorius is small and cylindrical composed mainly of a *vestibule*, this merging imperceptibly into a *channel* which develops into a muscular band, the *pylorus*.

When the stomach is empty or partly empty it is separated from the ventral abdominal wall by the liver and intestines, when nearly full or full it is indented on its greater curvature by the adjoining viscera, transverse colon, the left kidney and spleen, forward it comes in contact with the left leaf of the diaphragm and the liver. When full it reaches a relatively large size.

Like the esophagus, the stomach has four layers: The *mucous* layer lines the stomach and varies in thickness, being thinner at the cardiac end, increasing in thickness towards the pylorus. When the stomach is empty the mucous layer is thrown into many folds or rugae that disappear as the stomach becomes distended. The membrane is composed of tightly packed glands, in the upper fundus they are straight and tubular, in the pyloric portions they are elongated and in some cases bifurcated, penetrating to the submucosa. The membrana propria bears the blood vessels to the secreting surface and separates the glands. Mucous glands similar to those of the lower esophagus surround the cardiac entrance.

The *submucosa* forms a layer for the distribution of blood vessels and nerves before they enter the mucosa.

The *muscular layer* is composed of longitudinal muscular fibers that are continuous with those of the esophagus and run uninterruptedly through the pyloric portion, being chiefly along the curvatures and when reaching the pyloric part become heavier and thicker. The circular fibers are more massed in the antrum and pyloric areas mainly creating the sphincter arrangement of the pylorus. The oblique or innermost layer of muscle fibers in the fundus and body of the organ create a food channel, the *magenstrasse of Retzius* along which food may travel without intermixing with the general contents of the stomach, the oblique muscles also create the cardiac sphincter.

The *serous layer* is the covering formed from the peritoneal coat, and leaves the stomach along the curvatures to form the lesser and greater omentum.

The *blood supply*. Arterial: The right gastric artery, which anastomoses with the left gastric after passing along the lesser curvature and is continued by the gastroduodenal. This divides near the pylorus into right gastro-epiploic and supplies branches to the pyloric part of the stomach and passes along the greater curvature in the omentum

anastomosing with the left gastro-epiploic. The left gastric passes along the lesser curvature ramifying on the left part of the stomach and anastomosing with the right gastric. The gastro-splenic also supplies the left extremity of the stomach. All these branches originate from the celiac artery axis.

Veins: All the veins of the stomach empty into the portal vein, either through the mesenteric or gastro-splenic veins.

Lymphatics.—The small lymphatics in the mucous layer, converge in the submucosa, penetrate the mussular coat and appear on the serous layer. They usually follow the venous flow. The glands of the portal group are credited with full drainage of the area. It is my opinion that the lymphatic system of the dog and cat could stand further investigation, as I feel sure the entire drainage of this organ does not rest solely with this group and that there could be a regrouping of the glands mentioned and drainage into other lymph glands or group of lymph glands noted.

Nervous System.—The nerve supply is from the involuntary system, composed of the parasympathetic and sympathetic systems. The parasympathetic is formed by the *vagus* in a union of the dorsal and ventral divisions of the right and left vagus, concurring with the celiac plexus in forming the posterior and anterior gastric plexus. The sympathetic system originates from the *greater splanchnic* nerve which terminates into the semilunar ganglia, branches from this form the celiac plexus that gives off branches to the surfaces of the stomach.

In addition to the external nerve supply, the stomach has an internal set of nerve fibers formed in the muscular coat and in the submucosa, which are connected with the terminals of both the parasympathetic and sympathetic fibers. They retain peristalsis in the absence of external nerve control. The nerve supply in the muscular coat is called *Auerbach's plexus,* while that in the submusoca is known as *Meissner's plexus.*

Duodenum.—This section of the intestine is so closely related to the stomach that

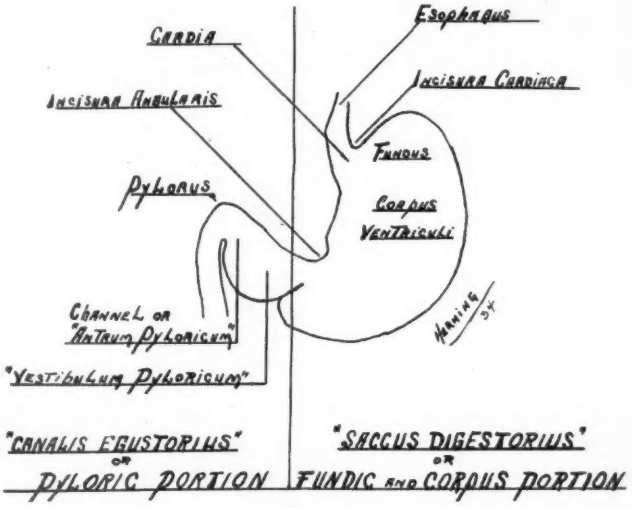

Fig. 4

it is of vital importance in the study of this organ. From the pylorus the duodenum passes posteriorly along the visceral surface of the liver, coming in contact with the right flank, going along the right side, at the pelvis it makes a U turn passing along the medial side of the colon and left kidney bending outward (ventrally) it joins the jejunum at the left root of the mesentery. Two or three inches (5 to 8 cm.) from the pylorus the bile and the smaller pancreatic ducts open into the duodenum and about one or two inches (2.5 to 5 cm.) back of this the larger pancreatic duct enters the duodenum.

The first portion of the duodenum is a continuation of the stomach. Its mucous membrane is similar to that of the whole intestinal tract with the numerous villi, that increases the capacity of the intestinal surface for absorption. The mucosa is lined

with tubular glands called *Crypts of Lieberkuhn,* which empty at the base and between the villi. The glands of Brunner are small acinotubular glands resembling the pyloric glands of the stomach; they lie in the submucosa and empty on the surface of the mucosa. *Peyer's patches* or glands are solitary glands of the intestines, minute nodules of lymphoid tissue projecting from the mucous membrane, about 20 being in the duodenum of young dogs.

Blood Supply.—The arterial supply is from the superior and inferior pancreaticoduodenal arteries and the venous supply from the superior mesenteric vein above and below empties directly into the portal vein. The lymphatics drain into the series of nodes about the head of the pancreas, and the nerve supply is derived from the splanchnic and vagus trunks.

Gastric Function. — Historically there are records of study of the gastric secretion of animals as early as the latter part of the 18th century. However, it remained for Pavlov and his co-workers (1897) to succeed in creating in a dog an isolated sac of the fundus portion of the stomach with its nerve supply intact and an opening provided directly through the abdominal wall. On feeding the dog they were able to study the pure gastric juice secretion that had not been mixed with food from the lesser sac. The Pavlov pouch is still used in research work today.

The physiologists have obtained much data and established certain facts that are of great importance to the veterinarian.

Pure Gastric Juice in the Dog is as colorless as clear water; it is odorless, acid in reaction, slightly salty to taste and to a certain degree mucilagenous. Pure gastric juice will keep for months, and is bacteria free but has no bactericidal action. It is the only secretion in the body containing free acid—hydrochloric—the concentration varying between four and five per cent (Pavlov); the acid is secreted by the cells of the fundus glands. Traces of lactic acid are regularly found in fasting dogs (Coutejean). The specific gravity of the gastric juice is 1001 to 1004. The two main enzymes are *rennin* and *pepsin*. Pepsin dissolves proteins in the presence of acid to peptones and albumoses. Rennin coagulates milk in the presence of calcium in a slightly acid or slightly alkaline medium. Raw milk gives a firm hard curd with the separation of a clear yellow liquid called whey. Boiled milk or cream gives a finer, softer curd (Rhefus). *Lipase* or *steapsin* is a fat splitting enzyme.

The greater part of the gastric juice—80%—is secreted by the fundus and corpus ventriculi portion of the stomach, this containing free acid and enzymes and ferments. The pyloric portion secretes a heavy mucilagenous secretion, alkaline in reaction and according to Ivy and Oyama, this contains no digestive ferments. Heidenhein believed that mucus was alkaline. Pavlov suggested it was the mucus which lowered the free acidity of the stomach by neutralization. Ivy made pouches of the pyloric antrum in dogs and found the secretion of these pouches to be "mucoid, viscous, tenacious, transparent, odorless, and slightly salty. It resembled egg-white in appearance and consistency, was slightly alkaline with a pH of 7.0 to 7.5 and neutral to litmus." Lim, in an exhaustive article on the relationship between gastric secretion and basal secretion of the stomach, states that "it thus seems not unlikely that the colloid nature of mucus accounts (absorption of alkali) for the tritable total acid found with the lowest secretory rates." He adds "at lower secretion rates the concentration of mucus is unquestionably higher especially in case the entire stomach juice, *containing pyloric secretion which is continous and little altered by secretory activity in the fundus.*" Fogelson observed "that in practically every case when the free acid was low, and excess mucus was present and conversely when the free acid increased little or no mucus was present. This observation was so consistent that a study of the rôle of mucin in gastric physiology with especial reference to its antiacid character was started." Hence from the observation of Fogelson, of Whitlow and confirmed by Klug, evidence points to mucus protecting the gastric mucosa against the gastric juice, against auto digestion of the stomach and to its pro-

longing the rate of dialysis of pepsin. When Fogelson fed a dog one-half ounce of mucin mixed with a pound of meat, free acid did not appear in the dog's stomach throughout the period of observation of from five to seven hours.

According to Pavlov, the amount of gastric juice secreted in a dog's stomach is in direct proportion to the amount of food eaten. He further demonstrated with dogs that had been esophagotomized and had a Pavlov pouch, when fed food that came out the divided esophagus, they secreted a full strength gastric juice, even anticipation of food created this, while fear, hate and other emotions retarded it. However, when he cut the vagus nerve this pyschic stimulation of the juice was not possible.

Foods in the stomach create a stimulation of gastric secretion. Pavlov introduced some water into the stomach of a dog through a Pavlov pouch, and a small amount of gastric secretion was noted. To prove that this involved a different sort of mechanism from that which stimulates the pyschic secretion he severed both vagi and the celiac plexus. He got a positive response from the introduction of raw meat. The most active secretion occurred following the introduction of meat extracts. Egg-white showed very little response and bread alone proved a poor stimulant; however, starch in combination with other foods stimulates secretion but by itself is negative. Alcohol and peptone cause increased secretion and is my reason for recommending nutritive liquid peptone feeding with the tube, as it has 22% alcohol in the solution.

Ivy found that a standard meat meal to which 50cc of water has been added leaves the stomach of a dog in three hours. When 400cc of water is added to a standard meat meal it leaves the stomach in 2½ hours, proving that water is a more active stimulant when given in larger amounts.

We can prove conclusively that forced feeding is justified. The chemical properties of food within the stomach gives rise to a secondary secretion of gastric juice—although psychic secretion creates a stimulation, food that does not produce this reaction is handled as readily as food that does. In forced feeding of dogs and cats, one should naturally select foods most suitable to the condition of the animal. For satisfactory results the reader is referred to the list

Fig. 5

mentioned in Part 3 of this discussion (December, 1934).

Thus we have demonstrated that in normal functioning of the stomach there is a psychic phase and a chemical phase during the act of eating.

That the amount of free acid becomes greater—then decreases during the interdigestive period, in which there is little or no secretion from the fundic and corpus ventriculi portion. The interdigestive phase is in direct ratio to the number and amount of feedings, this rest phase in adult animals being longer during the night.

That the mucus secretion is practically constant.

That depending upon the state of health and temperament of the individual animal, its environment, the amount and quality of food given and the number of feedings, the gastric cycle of the stomach repeats and repeats itself but each phase varies according to the factors presented.

Gastric Action and Control.—I have already related the action of the esophagus,

how the food bolus is swallowed and enters the pharynx, then esophagus, the peristaltic waves carrying it toward the stomach, the relaxation of the cardia to receive it.

The action of the cardia is like a delicate valve, superbly controlled. It relaxes in advance of the reception of the food bolus and closes after its reception. The fundic portion of the stomach is partly filled with air, this volume is kept fairly constant by the escape of surplus on relaxation of the cardia before entrance of the food bolus.

When the stomach is overly distended, if from food, the cardia relaxes and allows a regurgitation into the esophagus until the pylorus empties enough from the pyloric portion to take care of the fundic and corpus overflow. When the stomach becomes very full the autonomous nerve supply permits distension of the stomach walls, and even the abdominal muscles relax to allow for the distension and assist in preserving intragastric pressure, permitting proper mixing of the food contents.

My reason for this assumption is based on the fact that food entering the normal stomach is of a liquid, semi-solid or solid consistency, that is mixed by the fundus and corpus with pepsin and acid, handed on to the pyloric portion for further mixing and titrating. Should the contents be a mixed meal of proteins and carbohydrates, expulsion into the duodenum starts from 2 to 10 minutes after being received by the stomach. As before mentioned, there is sometimes a regurgitation into the esophagus for 30 minutes or more of the overflow, as soon as sufficient contents are discharged from the pyloric portion and the same amount as discharged is received from the corpus and fundic portion, a natural contraction of the stomach takes place. To me this seems logical.

However, Cannon advances another idea that is well substantiated by his work on cats. He claims that after 30 minutes more or less, the food is so thoroughly mixed with acid that it creates a tonus for the sphincter of the cardia and stops regurgitation into the esophagus.

The size and consistency of food, its time of entrance into the stomach, are all factors in the time of its discharge into the duodenum. Water alone goes directly through the gastric tube; when mixed or taken with the meal it hastens emptying time. Semi-solid or solid food is handled more slowly. As it enters the stomach it is arranged along the greater curvature, then when that is covered and more food is swallowed it is arranged along the lesser curvature, as this fills and more food enters the stomach it is arranged on top of the layer already covering the greater curvature, then on top of the layer already covering the lesser curvature, etc., etc.

Carbohydrates when fed first empty first, when mixed with proteins the emptying rate is retarded. Proteins when fed first are slower than carbohydrates, and fats empty slower than proteins. The coarser the pieces of meat are that are fed, the slower they leave the stomach and the more the intestines are saved from trying to do the stomach's work as well as their own.

The Peristaltic Waves progress over the fundus and corpus, knead and massage the food in that portion, distributing and mixing the pepsin and acid with the food. Starting at the cardia the waves become deeper and deeper as they progress until they reach the pyloric portion where they remain about the same level; this is the first peristaltic phase of the stomach.

The second phase, there is a contraction and lengthening motion of the pyloric portion similar to a milking rhythm and the chyme is discharged into the duodenum in a jet; then there is relaxation. The spurting of the jets of chyme are from three to five a minute.

The peristaltic waves, the effect of breathing, diaphragmatic pressure, body action all tend to assist in the general mixing of the gastric contents.

There are still many questions unsettled about gastric action. After reading all the literature I could get, and considering my personal observations, the logical conclusion is that chemical, mechanical and nerve sensitization are all factors vitally concerned in the functional control of the organ.

Barber or Surgeon?

FOR years the barber and the surgeon were one; but that was centuries ago. He trimmed, shampooed, deloused, lanced abscesses, took out obstinate teeth, treated wounds and fractures, applied leeches, and so on. Today we still have the surgeons (veterinary) who trim (pluck), shampoo, delouse, board, lance abscesses, take out obstinate teeth, treat wounds and fractures, and lo! draw blood samples! Yet, with the bombast of youth, he bellows, "I am a professional man!"

Professional man? Yes, in the sense that he has attended a recognized school of veterinary medicine. He acts the professional man, while attending to professional duties —at least we hope he does. Yet along with this he carries the taint of the kennelman, the farrier, the barber; and if he does not watch himself, soon becomes the tradesman. Is there any reason why the public should not be confused in determining his status?

As a professional man he is licensed by his state to practice the art and science of veterinary medicine and surgery. That cannot be interpreted in any way as applying to the plucking and boarding of dogs. In doing such, he sets up a vicious cycle.

THE kennelmen are afraid to refer dogs to him, for he is apt to talk the owner into thinking he is God All-Mighty when it comes to clipping. So the kennelman buys a sample set of patent medicines and becomes in the public eye a veterinarian. We were talking to a well known breeder of wire-haired terriers concerning this question, and he made the statement that he did not like to take the responsibility of treating sick dogs. Yet he had seen his dogs being plucked by the veterinarian that he had recommended the owner to see, when or if his dog became sick. The client, seeing him later, said that the "Vet" had suggested that he, because of his superior knowledge could do a better job than the kennelman. That veterinarian killed the bird that laid the golden egg. But does our veterinarian feel that way about it? No! Hasn't he built a pretentious building, elaborate in every detail (youth loves to be gaudy), and hasn't he had to do everything under the sun to keep the place filled to capacity? Thus the advertising display—"Dogs Boarded, Stripped and Bathed, Dr. X.'s Hospital," and again, "Dogs Boarded, Stripped, Bathed and Conditioned, Y.'s Kennel."

POOR Mr. Public finds his dog sick, at least he feels that it is sick, and various home remedies have proved of no avail. Perhaps it is his first dog, someone having given it to him as a present. He feels that something should be done. Let us follow his thoughts, "Let me see, I saw a sign. Yes! It said 'Dogs, Boarded, Stripped (I wonder what that means), Bathed and Conditioned.' Yes, that's it, conditioned." And so Mr. Public confused by signs, makes no discrimination between the kennel and the hospital. Mrs. Public, wanting to groom her pet Scotty for the local dog show, her first, goes through the same line of reasoning and ends up in the hospital—to have the dog groomed by a man as efficient in grooming show dogs as the kennelman is in treating distemper.

WE present this as food for thought. We may be in error, but it is our belief that the profession belongs to the profession, and the professional man should not easily throw away his birth-right. It is readily understandable why a kennelman does not object to being called a veterinarian. Who knows of a barber who would object to being called a surgeon? What would the surgeon's answer be?

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Tissue Toxins, Filterable Viruses and Their Differentiation*

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FOUR thousand years before Christ, Imhotep, an early Egyptian pyramid builder, who it is believed was deified as Esculapius, the Greek god of medicine, believed that injury, traumatic or otherwise, produced its effects by "the intrusion of something which the flesh engenders," "not something entering from the outside."

The most outstanding recognition of the soundness of this observation was made during the World War, which afforded the largest number of clinical cases ever known in history. The French surgeons turned the pages back, so to speak, to the surgery of Larrey in the Napoleonic wars. After their adoption of the debridement method of treating wounds caused by gunshot and similar missiles, the percentage of shock was materially reduced. Debridement consists of the complete removal of all lacerated, contused and otherwise devitalized tissue immediately surrounding a wound. It is most unfortunate that internists did not grasp the full significance of the surgeons' observations and delve deeply into this recognition of the existence of "tissue toxin" in wounds and carry the observations further. With the mass of clinical material available in the World War, there could have been established the fact that tissue toxins are responsible for subacute as well as acute maladies.

THE researches of one of America's outstanding biologists and physicians, the late Dr. Fenton Benedict Turck, have provided a medium through which there is available the explanation of many phenomena which heretofore have not been generally understood. Dr. Turck's first presentation of the facts he had gleaned regarding tissue toxins was published in the *Journal of the A. M. A.* in 1897, in a paper entitled Surgical Shock.[1] In this presentation Doctor Turck presented the protocols of experiments which showed that the blood that was taken from a dog suffering from shock would induce a similar condition immediately if injected into another dog. In subsequent presentations Doctor Turck brought to light the facts observed in cats and other animals to which various degrees of concentrations of homologous or specific tissue extracts or toxins had been administered. Turck gave the name of "Cytost" to this toxin which he believed to be the product of the cell, (Cytos being Greek for cell.) The validity of his contention concerning the toxic nature of shock and its sequelae has been recognized by such French scientists as Jeaneney,[2] Hartmann[3] and Limousin.[4]

The attention of the veterinary profession was called to this phenomenon in a paper presented by the writer in 1923, Tissue extract "Cytost" and its importance as an etological factor in disease.[5] Then again in 1924 the attention of the profession was called to Turck's theory in another presentation by the writer entitled Prenatal poisoning by tissue extract "Cytost,"[6] and more recently by a paper read before the New Jersey State Association meeting entitled Predisposing causes of Canine Distemper.[7] In all these there has been stressed to the profession, the possible solution of some of our vexing problems in animal diseases, through a better knowledge of the origin of cytost and its effects.

VETERINARY investigators apparently without knowledge of the literature on Doctor Turck's work, both in medical and veterinary publications, have corroborated his findings. Notable among these are Laid-

*Read before the Hudson Valley, N. Y., and Long Island, N. Y., Veterinary Medical Associations.

law-Dunkin with the product they believe to be a virus, dilutions of which have been the means of controlling, in large measure, the disease commonly recognized as canine distemper. Laidlaw-Dunkin found the so-called virus to be more easily extracted from the spleen than from other tissues. Another more recent work is a report by Leasure, Lienhardt and Tabener of Kansas State College, in the July issue of the *North American Veterinarian* entitled Feline Infectious Enteritis wherein even greater corroboration of the Turck theory is found. In their protocols Leasure *et al.* show that the so-called "virus" is found in the feces, urine, spleen, kidney, brain blood and adrenal tissues. They also show in their protocols the absolute specificity of this toxin of tissue origin through its lack of toxicity to animals of another species.

Additional articles recently presented were those of Dr. R. Manninger and Dr. F. Gerlach at the 12th International Veterinary Congress. Manninger summarizes in part: "In view of the ability of the ultraviruses to multiply, attempts were made, very early, to cultivate them on inanimate media, similar to the cultivation of bacteria. It is well known that this scheme did not work. Not until tissue cultivation had been used for ultravirus breeding was success attained in the growing of ultraviruses *in vitro*. The multiplication of ultraviruses depends on the presence of living cells. Especially easy multiplication is attained in tissues of which the cells are in the process of active division, though multiplication of virus may also take place in cells which do not divide, provided they still possess vitality. The multiplication of the viruses may be stimulated, therefore, by means of any interference which will hasten cell activity, and be retarded by any means which will arrest cell activity. In the animal body, too, the ultraviruses occasionally multiply, and do so especially well where cell division takes place abundantly. Efforts have been made recently, to grow ultraviruses upon apparently cell-free nutrient media, but such experiments have not progressed far enough to allow a judgment." He further states: "Some ultraviruses prepare the diseased organism for the action of secondary bacteria which in turn cause severe complications. The possibility has been voiced that secondary bacteria and ultraviruses are identical so far as the ultraviruses represent the filtrable phase of secondary bacteria; this conception, however, should be rejected decidedly."

Gerlach summarizes: "The opinion is held that the filtrable viruses are inanimate infectious agents of the nature of ferments, or ferment-like matter. Recently, the term 'virus-enzyme' has been coined with the purpose of expressing thus the striking similarity of the filtrable viruses to the true enzymes, and the distinguishing characteristic of their ability to reproduce"; then again, "The cultivation of the filtrable virus, outside the animal body, in an inanimate nutrient medium has been without success, up to the present time. The methods of cultivation which made use of living tissues as a medium for the growth of filtrable viruses *in vitro* are successful." He further states: "The filtrable viruses seem to hold a unique position with regard to their antigenic behavior, by which they differ from the higher micro-organisms. The antibodies obtained by immunization with filtrable viruses are in marked contrast with the type of antibodies occurring in antibacterial sera. Virucidal power may be demonstrated almost regularly. It is possible that the virucidal antibodies are closely related to the antitoxins and antiferments. After recovery from some of the diseases caused by filtrable viruses, the supervening immunity may be of long duration and of a high titre; the reason for this is unknown."

Both Manninger and Gerlach recognize a link or relation of the viruses to cell life and definitely record their dependence upon the cell and its products for their cultivation, multiplication or greater potency.

WITH this introduction let us now consider the question embodied in the title of this paper; Tissue toxins (Cytost), Filterable Viruses and their Differentiation.

A true filterable virus is consistent in its action. When injected experimentally or encountered through natural channels, a true

virus produces the same lesions. The virus of rabies and of foot-and-mouth disease are invariable in the pathological changes that they produce. It is the opinion of the writer that the so-called virus described by Laidlaw-Dunkin in canine distemper, by Leasure, Lienhardt and Tabener in feline infectious enteritis and those discussed by Manninger and Gerlach, may be the filterable tissue toxins (cytost) described by Turck as early as 1897 and subsequently recognized by other biologists. They may prove to be products of diseased and destroyed cells, specific for the species from which they are extracted. By this is meant that cat tissue extracts will produce certain pathological changes in cats but are negative in the same dose and concentration in the dog. Likewise dog tissue extracts are negative if injected in a cat. Neither will affect a guinea pig, rabbit, goat or other heterogenous animal. Various degrees of concentrations produce various degrees of reactions.

A high concentration is lethal.

A medium concentration is pathological.

A low concentration is physiological.

A BRIEF elaboration of the aforementioned reactions may be of use in grasping the full understanding of this phenomenon. A high concentration of tissue, heart, leg, spleen, lung, kidney or liver will upon injection produce either an instant shock death or a resultant acute pneumonia or enteritis with death occurring in less than 24 hours. Medium concentrations will induce subacute respiratory and intestinal disturbances. With continued injections arterial kidney and nerve involvements are very often observed. Low concentrations stimulate anabolic processes, causing cell division and multiplication with the development of immunity that follows antibody production by the cell. One fact to be born in mind is that the results of the injections cannot be definitely foretold. One subject may develop pneumonia, another enteritis and still another some definite disturbance of the nervous system. A few simple experiments may serve to demonstrate the certainty of the origin of this tissue toxin.

A ligature can be placed upon the leg of a dog, cat or other animal which will completely arrest all circulation. If the ligature is left in place the leg will become swollen and distended with the fluids confined and resulting from the inflammatory processes initiated through the destruction of cell life. The animal does not suffer any apparent distress while the ligature is in place inasmuch as there is no absorption of toxins from the diseased and destroyed tissues. If the ligature is released quickly after a few hours and the toxins permitted to enter the blood stream, the animal will go into a shock coma or develop symptoms of pulmonary or intestinal disturbances or both. It is interesting to note that in cats the intestinal phenomena are most frequently observed, whereas the dog will exhibit the pulmonary disturbances in the great majority of instances.* Isoautolysis of tissue cells may be induced and the intra-cellular products or stimuli liberated by any one of the following methods:

A—Physical: injuries, burns, scalds, sun, frost, X-ray, radium, electricity, etc.

B—Chemical: acids, ether, chloroform, alcohol, mustard, vesicating oils.

C—Biological: bacteria, foreign protein, ferments.

ALL of the aforementioned influences produce their effects through the destruction of the living cell and the liberation of the toxins or cytost from the cell. Through isoautolysis or liberation of a subject's own cytost we have the best method of demonstrating the toxic deadliness of this cell product. These may be illustrated by the following experiments:

A. Physical.—Shave an area on an animal, the operative site, thoroughly cleanse and render aseptic. Inject local anesthetic. Apply the actual cautery to a sufficiently large surface to destroy considerable tissue. Shock symptoms and subsequent death will be noted. The application of sterile dressings before and after the wound is made will preclude the possibility of outside influences gaining access.

B. Chemical.—The same procedure may be used substituting acid for actual cautery to pro-

*It might be mentioned in passing that herein lies the explanation of those baffling cases in your hospital that develop so-called distemper subsequent to fractures, spaying and Caesarean operations even though you have no infectious cases in your establishment.

duce death of tissue. A definite check can be made in this experiment through the analysis of the blood and urine specimens of which may be taken either after death from shock or during the coma prior to death. The fact that no trace of the acid used will be found either in the blood or urine is conclusive evidence that some influence has been liberated from the tissues by the agent used.

C. Biological.—A repetition of the leg ligation experiment may be used and while the leg is ligated a ferment or combination of ferments could be injected in the musculature of the ligated limb. Upon the release of the ligature, disturbances will result which will exhibit true clinical pictures of many diseases that are caused by specific organisms even though those organisms are not present. Doctor Turck has advanced the theory that these specific organisms produced their clinical symptoms by utilizing in excess, ferments normally secreted by the body. By various combinations of ferments, Turck was able to produce typical lesions of tuberculosis and glanders, even though the specific organisms of these diseases were absent. He therefore advanced the theory that it was through the destruction of cells by excess ferments and the liberation of the toxins from said cells, that specific organisms produced their deadly results.

Sufficient evidence is available through performing the foregoing experiments to warrant the belief that specific tissue toxins play a very important rôle in disease and death. There are records in the protocols of Turck which give evidence of these reactions and results having been induced through insufflation and injection of homologous tissue. The controls receiving corresponding doses of heterogeneous tissue extracts were not affected. There is also to be borne in mind the experience that almost every practitioner has noted at some time during his practice. It has been observed that kittens can be reared successfully in a kennel so highly contaminated with so-called distemper that puppies do not survive. On the other hand puppies can be successfully reared in premises where kittens succumb. With all the knowledge that is available through laboratory and field experience we should consider carefully the rôle that is undoubtedly played by this specific tissue toxin, cytost. We should also bend our energies toward the careful consideration of antisera (anticytost), both homologous and heterologous.

WE VETERINARIANS have within our grasp an opportunity of combatting disease that those in the parent profession of medicine do not have in the human. Through the availability of an almost limitless supply of homologous sera we have at our disposal the greatest natural weapon that can be used against disease, acute and chronic. In the laboratory we noted that a homologous serum could be given with complete safety in exceedingly large doses, which may be repeated as often as the case demands or as we wish. There is no danger in the use of homologous sera of unfavorable results in the form of anaphylaxis which often results from the use of heterologous sera. Heterologous sera are very unsatisfactory in their curative properties if the initial dose does not suffice. The tendency toward sensitization through the use of repeated administrations of heterologous sera was the problem that gave Banzaf the incentive to seek a method of refinement or concentration in order that larger amounts of antibody or antitoxin content could be given in the initial dose. There is no need for refinement or concentration of homologous sera. There is no danger of any unfavorable reaction regardless of whether it is administered subcutaneously, intravenously or intraperitoneally. The absorption of the antitoxin or anticytost content of homologous sera always precludes the danger of unfavorable results. It has been observed that all antibody complement of the blood is found in the serum. We therefore are in a very favorable position to treat successfully certain diseases through the use of homologous antisera.

THOUSANDS of gallons of homologous sera are available in our large abattoirs. The recovery of this sera from the abattoirs where thousands of horses, cows, sheep, pigs and poultry are slaughtered yearly would be a step in the right direction. We are using various chemicals in the treatment of chronic and acute infectious diseases which undoubtedly could be much more satisfactorily controlled by large doses of homologous sera.

There is a tremendous field open for immunologists to devise some method of titrating homologous antisera. If the antibody strength or content of homologous antisera could be accurately determined

there are possibilities of untold magnitude in its use. Regardless of whether or not its real titration is known, there will *always* be a beneficial result following the administration of homologous sera and absolutely no danger of anaphylaxis. It can be used in cases of septic fevers and similar disorders with a much higher degree of safety than direct transfusions. Transfusions are impractical for the practitioner in the field and may be dangerous as well if facilities for blood typing are not available. The use of homologous antisera, if carried out in large repeated doses would undoubtedly completely revolutionize our present treatment of various diseases. In those cases where transfusions are indicated because of a marked anemia, favorable results would undoubtedly be achieved through the use of homologous antisera with the addition of injections of known quantities of hemoglobin in the form of liver extracts. It is to be hoped that the time is not too far distant when it will be possible for us to procure homologous antisera for each species at a cost that will be commensurate with the results. We should not hesitate to explore this field so fortunately placed at our disposal. We could perhaps lead the way for the medical profession to follow, through the facilities of research that are ours.

Homologous Media

Here is still another field yet to be explored in which there will undoubtedly be found great possibilities through its development. Up to the present there has not been any real extensive work done along the lines of using media such as bouillon and serum extracted from a certain species in which to cultivate certain disease producing organisms commonly found in that species. There is a possibility that organisms recovered from a dog will produce more potent vaccine, toxoid or bacteriophage, if grown upon an extract or bouillon made from the tissue of a dog than from beef. When organisms are grown on heterogeneous media, there is a possibility that certain revolutionary changes are brought about through their transplantation from one influence to another.

THERE is also an added advantage in the use of homologous media. A certain amount of homologous cell tissue products would be included in the agents used for preventive purposes, and products such as vaccines and toxoids might possess a higher degree of preventive and curative values if prepared from organisms grown upon an homologous media. The exploration of this field might be instrumental in the production of auxiliary preventive inoculations for the various diseases which are thus far attributed to filterable viruses. Any successful vaccinations that could be achieved against a secondary invader would undoubtedly result in the prevention of the production within the animal economy, of an excessive amount of the products of diseased and devitalized tissue cells, since it may be through the poison produced by the cells that the bacteria produce the pathology.

Conclusions

There is no desire upon the part of the writer to detract one iota from the splendid work of Laidlaw-Dunkin in canine distemper or Leasure, Lienhardt and Tabener and others in feline infectious enteritis. Quite to the contrary the aim of the writer is to give a foundation and background for their presentations, by which their observations could be established as being biologically sound. It is also the aim of the writer to focus the attention of veterinary scientists and practitioners on the possibilities that lurk in the exploration of this field in biology, opened through the researches of Doctor Turck. We are on the threshold of a new era and the conclusion used in the first presentation of the writer in 1923 is quoted as still being a pertinent and sound observation:

"Is it not logical to assume that the fundamental etiological factor in disease is biological in character? It is quite evident from the results of the various and countless experiments performed that there is a sound foundation for such an assumption. Through the efforts of Dr. Turck we have within our grasp the explanation and interpretation of many phenomena heretofore not understood. Much valuable material has been

presented on the histological and pathological changes found in various diseases, but these are *effects* and not *causes*. There is only one way in which we, as veterinarians, can become more proficient along preventive lines, and that is the augmentation of our knowledge of etiology.

This is possible through a better comprehension of source, and action of cytost."

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Do You Remember?

1. Question. Define condyle; diaphysis; diarthrosis; sphenoid, and volar.

Answer. A condyle is a rounded, articular extremity of a bone; a diaphysis is the shank or middle part of a long bone, as distinguished from the ends or epiphyses; a diarthrosis is a joint which is movable and has a joint cavity; sphenoid denotes structures which are wedge-shaped; volar designates the posterior face of the forelimb below the elbow.

2. Q. What is the largest salivary gland in the horse; in the cow; and in the dog?

A. In the horse, the parotid gland is the largest; in the cow and dog the mandibular or submaxillary gland is the largest.

3. Q. Where is the cisterna chyli?

A. This receptacle for lymph is situated below the first and second lumbar vertebrae and on the right side of the aorta. The thoracic duct originates from this structure.

4. Q. On which side of the heart is the tricuspid valve?

A. The tricuspid valve guards the right atrio-ventricular opening. The atrio-ventricular opening on the left side is guarded by a bicuspid (two-pointed) valve.

5. Q. Name the walls of the aorta from within outward.

A. The innermost coat is the intima (inmost), the middle coat is the media (middle) and the outer coat is the adventitia (coming from abroad). The media contains a great amount of elastic tissue and is indistinctly separated from the other two coats.

6. Q. What are the afferent blood vessels of the liver?

A. The afferent blood vessels of the liver are the hepatic artery and the portal vein. These two blood vessels along with the bile duct constitute the "portal canal."

7. Q. Name the three coverings of the spinal cord.

A. The spinal membranes or meninges are: (1) the dura mater (hard mother or protector) which is outermost; (2) the arachnoidea (spider-web like) in the middle; and (3) the pia mater (tender mother) which lies next to the spinal cord.

8. Q. What are the three main branches of the trigeminal nerve and what general region does each supply?

A. The chief branches of the trigeminal (triplet) or trifacial nerve are: (1) the ophthalmic nerve, which is sensory, supplies parts close to the eye and part of the nasal septum; (2) the maxillary nerve, which is also solely sensory, supplies parts next to the eye, the nasal septum, the palates, gums and the upper lip; and (3) the mandibular nerve, which is both motor and sensory, sends branches to the ear, cheek, tongue and chin, and to the pterygoid (wing-like) temporal (of the temple) and masseter (masticator) muscles.

9. Q. Which species of animals have a guttural pouch; ossa cordis; an os penis; an os rostri, and a syrinx?

A. Guttural (throat) pouches are found only in the equine species; ossa cordis are the bones found mostly in the heart of bovines; the os penis is found only in carnivorous (flesh eating) animals; the os rostri (bone of the beak) is the bone in the snout of pigs; and the syrinx is the voice box found only in birds.

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Drugs Used in Veterinary Medicine

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Introduction

This series of articles treats of the more important drugs employed by the veterinarian of to-day.

They are presented with the object of emphasizing both the scientific as well as cultural background that attaches to our prominent materia medica.

Each of the discussions, whether from a natural or a synthetic origin, will include as complete details as possible under the following captions:

History
Source and Description
Preparation
Properties
Action
Therapeutic Use and Dosage
Toxic Effects

The facts here presented have been gathered from recent clinical findings or from that practice which has been most commonly accepted within the profession. Since each of these discussions is a part of the whole, it is suggested that they be filed conveniently for reference during the series.

I. Nux Vomica—the Source of Strychnine

History.—Nux vomica, though widely used to-day, is only a comparatively recent addition to medicine. There is no record of its existence amongst the ancients, but the Arabians appear to have been the first to introduce it into Europe. The first description of this drug dates back to 1640. At that time is was described as having no medicinal value but had marked qualities in "killing dogs, cats, crows and ravens." The Hindus have been known to employ it extensively under the name of "Kuruchilla" for dysentery, fevers and dyspepsia. Its most active principle, strychnine, although first discovered in the St. Ignatius Bean, was isolated about 1819 by two French pharmacists, Pelletier and Caventou. This alkaloid has largely supplanted the crude drug from which it is derived.

Source.—The drug consists of the dried ripe seeds of *Strychnos nux-vomica,* a small tree indigenous to India, but found also in Northern Australia, China, Siam and Ceylon. The fruits of this plant are about the size and shape of an orange, and are similarly colored. They contain from one to five seeds which are imbedded in a whitish pulp which is removed by careful washing. The seeds are then placed in the sun to dry, after which they are sorted and packed into bags or bales. The seeds are disc-shaped, about an inch in diameter, and almost flattened except for the centers and margins. They are one-fourth inch thick and are covered with mouse-colored silky hairs on all sides. They have no odor, but are extremely bitter to the taste due to the two active constituents, strychnine and brucine. The seeds are commonly called "dog buttons," "Quaker buttons," "poison nut" and "rats' bane." In Germany they are known as "crow's eyes."

Preparation.—The various preparations of nux vomica are the powder, extract, fluidextract, tincture, elixir and compound pills. To meet the standard, the crude drug must contain 2½% total alkaloids. Strychnine is prepared from the drug by extraction with water acidulated with hydrochloric acid, after which it is concentrated and treated with lime. It is then boiled in alcohol, and after cooling and concentrating, the crystals settle out.

Properties.—Chemically, strychnine itself has the formula $C_{21}H_{22}N_2O_2$. The structural arrangement is not altogether clearly determined. It consists of a colorless crystal or white powder which has no odor but an extremely bitter taste even in very dilute solutions. It is very slightly soluble in

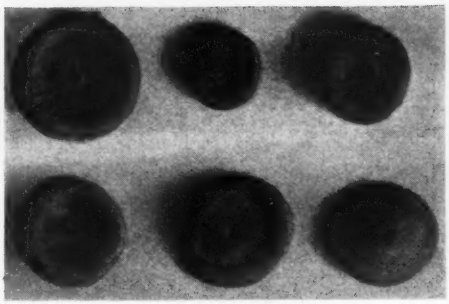
water, and but slightly soluble in alcohol. It is incompatible with alkalies, iodides and bromides, for which reason it should never be prescribed with such substances unless "shake well" directions are provided in the prescription.

The salts of strychnine in the form of the nitrate and sulphate are readily soluble in water, the latter being more so than the nitrate. For this reason the sulphate is usually prescribed.

Brucine, the other alkaloid of nux vomica, usually present in about the same amount as strychnine, has the formula $C_{23}H_{26}N_2O_4$. It is very bitter, more soluble in water than strychnine, and can be separated from the latter by means of alcohol in which brucine is more soluble. Its action is somewhat different than that of strychnine, but since the latter represents the action of nux vomica the brucine effect will not be discussed here. Some authorities still claim a similarity in action of the two alkaloids, though the brucine is considered about one-thirtieth to one-eighth as strong as strychnine.

Action.—The action of strychnine is far more rapid than that of nux vomica, for which reason the latter is sometimes purposely employed because of its prolonged action. The alkaloid stimulates the central nervous system, the smaller dosage usually affecting only the spinal cord. With larger doses, the effect reaches the medulla oblongata. In the spinal cord the action is primarily upon the reflex centers causing greater reception toward incoming impulses and greater activity in the transmission of impulses which travel outward toward the motor areas.

Thus an improvement of all the major functions follows the reflex influences. The respiration, the heart action, digestion and the general nutrition are all benefited and a general state of well being follows. There is also an increase in the tonicity of the muscles. This tonic action of strychnine is of great significance. In many forms of temporary paralysis in which the nervous control of the muscles is impaired or where there exists atony of the muscles of the digestive or urinary tract, its use is indicated. As has been already stated, larger doses of the drug influence the medulla. The respiratory centers and also the vasomotor centers are chiefly affected. It is not, however, considered as a direct cardiac stimulant and therefore cannot be relied on in circulatory emergencies. The peripheral circulation and oxygen consumption are however increased and for this reason, even though the blood pressure effects are slight, it may be considered as a circulatory stimulant.



Seeds of Strychnos Nux Vomica

Strychnine can not be depended upon, however, in the emergency treatment of shock, collapse or crises of acute diseases when heart action is threatened. When used as a respiratory stimulant it should be remembered that large doses exhaust the centers that control this function. The tone of the bronchial muscles and the cough reflex are strengthened and this is desirable for atonic states when abundant secretions are to be coughed up.

Because of its bitter taste, strychnine stimulates digestions. It brings about a stimulation of the secretions and also heightens the response to food increasing the peristaltic motions and hunger contractions.

It improves the special senses of sight, smell and taste.

Strychnine is very promptly absorbed, particularly from the intestine usually taking only a few minutes when food is absent. When administered intravenously, it has been found that a large percentage leaves the blood in but a few moments. Most of the drug is rapidly oxidized in the animal

body, the rest is eliminated by way of the urine. The liver destroys most of the dose, after which the kidneys eliminate the remainder. Traces of the drug can be found in the urine for several days afterward. If it be recovered from such urine, it is found as active as though it had not passed through the system.

Dogs have little tolerance for the drug. Guinea-pigs show a much greater tolerance. Humans show a tolerance up to 4/5 of a grain, which otherwise is distinctly toxic. Such resistance is built up through gradually increased dosage.

Therapeutics.—The use of the drug or its alkaloid depends upon its stimulant properties. It is never used externally since it is too irritant. Internally it has widest use as a general tonic, as a stimulant to digestion, as a respiratory and circulatory stimulant, and in various conditions of motor paralysis which find their origin in the spinal cord. As a general tonic, it acts by stimulating all muscle fibers and thus increasing their tonus resulting in an invigorating feeling on the part of the animal. Its effect on digestion is obtained by its reflex effect as a bitter, thus increasing the secretions and appetite; and it also simultaneously increases peristalsis by its effect on the smooth muscles of the stomach and intestine. It has great value where there is atony in the digestive tract and where persistent constipation exists or where there is diarrhea from the same atonic condition.

In horses and cattle when there is intestinal derangement due to overloading, strychnine is effective because it prevents dangerous fermentation. It has especial use in the case of anemia where constipation and atony exist. For this reason, as with humans, arsenicals and iron compounds are often used in combination along with nux vomica or strychnine.

In case of diseases of the respiratory tract such as bronchitis, emphysema, influenza or pneumonia it is indicated because of its favorable effect on digestion as well as its direct effect on the respiratory centers. For the same reason, it is useful in asthmatic conditions of dogs or "heaves" of horses.

Its use in depressing conditions of the circulation does not depend so much upon its direct cardiac effects, but upon the general influence it shows upon the peripheral pressure and also its influence upon the blood stream indirectly by its respiratory effects. For this reason it is sometimes employed along with the direct heart tonics in such conditions as surgical shock, general collapse and in cases of poisoning by such depressants as morphine, chloroform and ether.

The drug is used for alleviating paralytic conditions which have a functional rather than an organic origin. It should not be used where inflammation of the nerve elements at the centers is found on diagnosis. It is used with benefit in chorea of dogs, in paraplegia of dogs and cattle, and after cerebrospinal meningitis in horses. It has also a place in relieving the paralysis which occurs peripherally after traumatism. Prolapse of the rectum and atonic conditions or paralysis of the bladder with retention of the urine have also been benefitted by this drug.

Dose Table

Drug or Preparation	Animal	Apothecary	Metric
Powder or Fluid-extract	H	zss-ii	2.-8.
	C	zi-iii	4.-12.
	S	gr. x-xx	.6-1.3
	D	gr. i-ii	.06-.13
Extract	H	gr. ii-xv	.13-1.
	C	gr. iii-xx	.2-1.3
	S	gr. i-iii	.06-.2
	D	gr. 1/8-1/4	.008.016
Tincture	H	zi-vi	4.-24.
	C	zii-viii	8.-30.
	S	mxx-xl	1.3-2.6
	D	mv-xv	.3-1.
Strychnine (orally) or Strych. Nitrate or Strych. Sulph.	H	gr. 1/2-ii	.03-.13
	C	gr. i-iii	.06.2
	S	gr. 1/30-1/5	.002-.013
	D	gr. 1/200-1/30	.0003-.002
Hypodermically ½ these doses.			
Citrate of Iron & Strychnine	H	gr. x-xv	.6-1.
	C	gr. x-xx	.6-1.3
	S	gr. ii-iv	.13-.25
	D	gr. i-ii	.06-.13

There are other preparations including, the elixir of iron, quinine and strychnine phosphate (1 dram contains 1/65 gr. or .001gm strychnine); the syrup of iron, quinine and

strychnine phosphate (1 dram contains 1/80gr. or .0008gm strychnine); the glycerite of iron, quinine and strychnine phosphate (1 dram containing 1/20 gr. or .0032 gm strychnine); the compound syrup of hypophosphites (1 dram containing 1/35gr. or .0005gm of strychnine); and compound laxative pills (each pill containing 1/120gr. or .0005gm strychnine).

It must be pointed out that all dosage should be proportional to the weight of the animals. Particular attention in this regard must be given to dogs since they are particularly susceptible to the effects of strychnine. It is advisable to begin dosage, using the minimum amount for small animals. Usually one grain (in four doses) will be found sufficient to produce therapeutic effects in horses. Where animals are suffering from depression, it will be found that the dose can be exceeded markedly beyond what is usually the safe limit. This is particularly true in the case of motor depressant drugs. Strychnine should not be used continuously, but only to tide the animal over a period of weakness or collapse.

Toxicology.—The toxic effects of nux vomica or strychnine poisoning are due to the excess stimulation that it causes on the nervous system. At first there is restlessness, twitching of the muscles, and rigid neck. Later the uneasiness increases and tetanic convulsions soon appear. The animal soon assumes the state of opisthotonos which lasts several minutes and is followed by a period of relaxation. The intermittent spasms appear more often and the period of relaxation becomes shorter and shorter particularly if there be a transmission of any slight stimulus such as a knock on the door, a slight draught, or even the turning on of a light. Unless there is prompt treatment or the overdose be small the animal will soon become exhausted from the over-exertion or will be killed by asphyxia caused by the spasm of the respiratory muscles or paralysis of the nervous centers.

As little as 1/60gr. of the alkaloid kills terriers, and five grains of nux vomica has been known to kill several dogs. Whereas in dogs a small overdose causes tetanic convulsions in as short a period as ten minutes, horses do not react for some time (20 minutes to 6 hours) after administration. Three grains of the alkaloid or one ounce of the crude drug is fatal to horses usually. Cattle are similarly affected but generally a larger dose is required to produce fatal results because of the difficulty with which the drug is absorbed from the complicated and capacious digestive tracts of these animals. For swine the fatal dose has been found to be about 1/6 grain. Chickens are less susceptible.

Strychnine poisoning can be differentiated from other symptoms by intermittent character of the spasms, by the rapid course of the syndrome, and by the opisthotnos state of the victim. It should not be confused with eclampsia or tetanus in which the signs are more or less of a persistently uniform character and are uninfluenced by external stimuli.

The treatment of strychnine poisoning consists of affording the animal as much quiet as possible; handling as little as possible or not at all. If the case is seen early and spasms have not begun, a stomach pump (tube) or emetics are indicated to prevent absorption. Otherwise chloroform, chloral hydrate, ether or large doses of bromides are recommended. Paraldehyde does not depress the respiratory centers as does chloroform and chloral hydrate which have this disadvantage and should be administered with care.

Recently, the barbituric acid derivatives have been shown to be very effective when used intravenously. The dose depends upon the degree of poisoning. The injection should be made slowly, in patients quiet enough for intravenous medication, and to effect; or intraperitoneally.

Magnesium sulphate has been shown to act favorably when injected intraspinally. Gitehns and Meltzer recommend an intravenous injection of Ringer's solution together with administration of ether anesthesia.

When strychnine is given in large dosage the appearance of nervousness, excitement and twitching of the muscles should serve as

a distinct warning that toxic symptoms are beginning to appear. The drug should never be given when the diagnosis shows spastic conditions of the voluntary or involuntary muscles exists, when there exists a lesion involving the motor areas of the spinal tract, or when the reflexes are already excessively active.

Morphine should never be administered as an antidote for strychnine poisoning since this does not counteract the effects on the cord and does depress the respiratory center which is already in danger.

Some authorities recommend strychnine for the destruction of small animals by injecting it into the gluteal muscles in large doses. Such, however, results in an agonizing death and should not be practiced.

There is no doubt that nux vomica and its alkaloid, strychnine has a well-deserved place in veterinary materia medica when the dosage is well regulated and when conditions do not contra-indicate its use.

* * * *

Roentgenological Examination

The Roentgen-rays play a definite rôle in the diagnosis of changes from the normal when one has to examine internal organs, particularly when fractures, foreign bodies, neoplasms, tumors, obstipation, dilatation or stenosis of the digestive tract, enlargement of lymphnodes in the thoracic cavity, urinary and renal calculi, pregnancy, pyometra, etc., are under consideration.[18]

Their application in small domestic animals is performed easily with the same apparatus used in human Roentgenology. Large animals, however, require an apparatus of more stout construction and with proper protective mechanism for the fixation of animals. In the small domestic animals, all the organs can be demonstrated by Roentgenological means, but in the horse and ox merely the head, neck, thorax, anterior and posterior extremities below the elbow and stifle respectively can be exposed to examination. The abdomen, the back, the pelvis and the shoulders are either not at all, or only partially adapted to this method of examination.

There is a distinction between Roentgen-illumination and Roentgen-photography. The latter gives more detail than the illumination; thus it is more accurate. Illumination and photography differ from each other as do negative and positive prints. In order to heighten the contrast in the x-ray picture, diaphragms are used in the exposition. They result in greater sharpness; the effect obtained from the diaphragm in the photographic camera is similar to this.

Gas pockets, such as intestinal loops, lungs, maxillary cavity, appear very light-shaded in the Roentgenological picture. Parenchymatous organs, especially the testicles, and neoplasms produce a more or less dark shadow. Foreign bodies appear in the Roentgen-picture usually as black shadows which are strikingly set off from the surrounding tissue. Other foreign bodies, those which are permeable to Roentgen rays, may, however, be obscured in the Roentgen picture. The liver shadow, which also is very dark in the Roentgen picture, may occasionally veil small foreign bodies, such as needles.

In order to demonstrate certain lesions which otherwise would not appear in the Roentgenological picture, it has become the vogue to fill the organs with substances which are impenetrable to Roentgen-rays. For instance, a barium sulphate mixture is used to trace the outlines of diverticles and dilatations of the digestive tract, or to make those foreign bodies visible, which are permeable to Roentgen rays. Potassium iodide solution is used for the visualization of the bladder.

Roentgenological exposures are of diagnostic value in cases of tuberculosis in dogs. In addition to the darkening of the lung field, indicating pneumonia and pleuritis, there will be seen a very pronounced enlargement of the mediastinal lymphnodes, recognizable by their being brought into relief from the surrounding tissue. Enlargements of mediastinal lymphglands, due to different etiological factors, occur likewise, but they are comparatively more rare.

[18]Wirth, D., translation from "Klinische Diagnostik" (180 pages), published by Urban and Schwarzenberg, Berlin, Germany, and Vienna, Austria.

Ruptured Yolk

In this group of autopsies[14] are included all cases in which a thick, syrupy fluid, the remnant of the ruptured yolk, was found in the abdominal cavity, associated with more or less pronounced lesions, such as cloudiness of the serosa, capillary injection, fibrinous deposits, indicating either a beginning or an advanced peritonitis. As mentioned previously, ruptutre of the ovarian follicles is not a rare occurrence in hens which suffer from a severe infectious disease that attacks primarily the abdominal organs. This is the case, for example, in fowl cholera and in fowl plague. In all such diseases the ruptured yolk is a symptom of the particular infection and cannot be construed as an ovarian disease in the sense of the present statistical consideration. Experience teaches, on the other hand, that in a number of more or less severe organic diseases, for instance in pneumonia and in enteritis, an ovarian follicle may rutpre suddenly, adversely influencing the primary disease, and even hastening the fatal end. These cases, in which the ruptured yolk and the developing peritonitis were an essential part of the autopsy finding, have been included in the statistics under discussion.

There were altogether 33 cases (22.3%) in which a more or less pronounced pneumonia or enteritis was present in addition to the ruptured yolk.

Among 49 cases of ruptured yolk there were other pathological conditions of the oviduct present, aside from the abnormal content of the abdominal cavity. These conditions were either an acute or a chronic salpingitis, with or without egg concrements, atrophy or stenosis of the oviduct, etc. In the other 99 cases observed, such lesions were absent. This indicates plainly that the abnormal changes of the oviduct do not form an indispensable predisposition toward the occurrence of ruptured yolk, though, in certain cases they may do so. We will have to assume that in a considerable number of cases other influences, especially external causes, such as chasing of hens, squeezing through narrow fence-openings, manipulation of the fowl, etc., are responsible for the rupture of an ovarian follicle. In this connection it is also significant that of the 148 hens which died due to ruptured yolk, 32 (21.6%) had been suffering from a marked generalized adiposity. The aggravated friability of the vessel walls in these animals was often recognized by the presence of more or less large bloodclots in the yolk-mass in the abdominal cavity. Thus, these cases of rupture of the ovarian follicle, characterized by the admixture of bloodclots, form the natural transition to the true traumatic ovarian hemorrhage, which cases represent a considerable part of the fatal injuries to the reproductive organs caused by awkward assistance for "eggbound" and by similar manipulation.

[14]Eber, H., translation from "Die durch Obduktion feststellbaren Geflügelkrankheiten" (320 pages; 43 illustration), published by M. & H. Schaper, Hanover, Germany, 1934.

* * * *

"Worming" and Fright Disease

My experience convinces me that fright disease in dogs is due to irritation or inflammation of some portion or portions of the alimentary tract, usually caused by either improper feeding, such as giving large quantities of bread or vegetables and rice as the principal diet or worm medication so much practiced by the average dog owner. Two-thirds of the dogs in my practice that are "wormed" by the owners later develop canine hysteria.

Recently there has been less hysteria in this vicinity than formerly, due to the financial condition of the average dog owner, who hesitates to purchase the usual advertised worm capsules.

No diagnosis justifying "worming" can be made without a microscopic examination of the feces. Faulty medication is responsible for 75% of the cases of hysteria in my locality.

James A. Benner,

Bethlehem, Pa.

A General Consideration of Endometritis

By C. E. De CAMP,
Nopera Park, New York

ENDOMETRITIS is one of the most commonly seen infections in a veterinarian's daily work. It is an inflammation of the lining of the uterus, brought about by the presence of microorganisms or their toxic products. The ridges and folds in the mucosa, together with its placental attachments, make it particularly susceptible to pathogenic organisms, and often difficult to reach completely with medication. The cow excels all other domestic animals in frequency and variety of diseases of the generative organs. It has been estimated[1] that uterine affections inflict greater loss on dairy stock owners than do the affections of all other organs put together, so great is the loss caused by metritis in actual deaths, in sterility, in still born and immature calves, etc.

IF A cow has metritis during her pregnancy, which has not been sufficiently intense to destroy the life of the fetus, the meconium of the new-born calf frequently shows culturally the same bacteria as are present in the uterine cavity of the mother. A constant harmony usually exists between the degree of disease in the uterus of the dam, and the tendency of the calf to suffer from scours transmitted from the mother to fetus.[3] This is especially important when it is remembered that no resistance of any practical value to organisms in the uterus is transmitted to the offspring.[4] One can appreciate readily the importance of infection being transmitted from an infected uterus to a calf, when it is recalled that more cattle die from disease during the first few weeks after birth, than in any other period of similar duration.

A new-born calf may survive the acute infection of white scours, but the causative organisms obtained from the infected endometrium of the mother are usually not completely eliminated. The ravages of the disease are only restricted, the contagion assumes a chronic type for the remainder of the life of the offspring, exerting a continuous harmful effect on the animal, and often imperiling its life.

Metritis is due to the presence of pathogenic organisms in the uterus. They gain entrance through the cervix at time of service, during manual assistance in delivery, and at other times when the uterus is exposed to the exterior. Although many different organisms cause metritis, the most commonly seen are streptococci, staphylococci, *B. pyogenes,* and members of the *B. coli* group. Trichomonads also have a direct and important bearing on the occurrence or continuation of metritis. The activities of these organisms result in inflammation, with all of its usual signs.

THE establishment of the disease of course brings up the question of treatment. One general principle concerning metritis which should be kept in mind is that the disease is an "open wound" infection. Active pathogenic organisms are present which, if not checked or eliminated, will gain access to the general circulation, resulting in an extensive septicemia. This is especially true when retained fetal membranes are torn away, thereby leaving exposed many "open wounds" in the endometrium.

A contagion in the reproductive organs is transmitted continuously from generation to generation. To control this progressive infection effectively, or to eliminate it, it must be attacked in its principal area of activity —the uterus itself. The time for such attack is, of course, when the uterus is empty, following regular parturition or premature delivery. It is extremely important to protect the uterus at this dangerous period, to

guard the life of the patient, secure good lactation, and prevent sterility.

Medication used in the uterus following parturition is often ineffective, due to the large amount of foreign material present, as blood, serum, placental fluids, etc. The most common method of treatment is to remove as much of the contents as possible from the uterus, and then attack the infection by placing suitable bactericides directly into the organ. Stader reports using Carrel-Dakin solution in irrigating the uterus hourly for 24-36 hours.[5] Due to the nature of the uterine mucosa, it cannot be disinfected. The same is true of infected wounds, but a wound can be made cleaner by the use of a disinfectant judiciously applied.

CLINICAL experience shows that azamine is an unusually effective medicament for this purpose, due to the fact that it dissolves in the uterine liquids mentioned, and penetrates the tissue fragments in the uterus.[6 7] The medicament reaches the endometrium, exerting a deep-penetrating, bactericidal action. In addition to the effect on the endometrium, azamine is eliminated promptly through the genito-urinary tract, with a bactericidal action on microorganisms usually present as the result of infective processes elsewhere in the body. Used as a prophylactic measure in each animal that freshens, this agent tends to prevent the development of infection already present.

IN SMALL animals, endometritis runs a close parallel to the disease in large animals. The tissues involved, the causative organisms responsible, the way the disease is transmitted, the symptoms and the effect on the life and later breeding capacity of the animal are practically the same in both large and small animals.

The terms metritis and pyometra in the small animal are often used incorrectly. In the strictest sense, metritis is an acute inflammation of the endometrium occurring after abortion, parturition, or a period of season. Pyometra is a chronic disease process and is frequently present at any stage of the animal's life, and often unobserved. We draw special attention to the difference of these two terms, inasmuch as metritis will respond to medication while pyometra calls for removal of the infected uterus, which is simply a collection of purulent material in the uterus, unable to escape or to be drained away because of the closed cervix.

DUE TO the small size of the uterus in small animals, it is often impossible to introduce medication through the cervix to contact the endometrium. Treatment has usually consisted of symptomatic measures in an attempt to aid the animal in checking the progress of the infection, and bringing about its cure. Therapeutic agents which attack the infection in the endometrium have not been available up to this time. The effectiveness of azamine for this purpose has been definitely established. Administered orally, it is absorbed into the blood stream, carried to the infected endometrium, and attacks the pathogenic organisms throughout the diseased coats of the uterus.[8] The added therapeutic effect on the kidneys, mentioned above, also results. Response of the animal, which is usually permanent, is shown in a lessening of the vaginal discharge and general systemic improvement. The breeding efficiency of the animal is usually retained.

In conclusion, I repeat, an infection in the uterus has an influence on the breeding efficiency, the quality of the offspring, and the general physical condition of the animal. In the dairy cow, the milk production capacity of the animal is often markedly lowered. The use of prophylactic measures to prevent the occurrence of uterine infections is of great value.

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Abstracts

Coccidia of Horses

The Coccidia[1] found in horses were: *Eimeria solipedum* n. sp., with spherical occysts, *Eimeria uniungulati* n. sp., with oval occysts. Other coccidia found in solipeds were: *Eimeria faurei* Moussu and Marstel 1901; *Eimeria smithi* Yakimoff and Galonzo 1927; *Eimeria bukidnonensis* Tulangui 1931; *Eimeria azerbaidschanica* Yakimoff 1933, and a species of Tsostora.

* * * *

X-Ray Photography

Storage of the contrast medium Thorostrast[2] takes place first in the spleen, liver, kidneys, adrenals and ultimately in the placenta. Massive doses of thorostrast likely interfere with the materno-fetel metabolism, resulting in abortion and death. The placenta-shade can be obtained as early as the twelfth to thirteenth day of pregnancy.

* * * *

Habits of Trichinae

The trichinae do not live and copulate in the lumen of the intestinal tract[3], but invade the villi of the intestinal wall soon after being liberated from the digested muscle tissue. Shedding of the skin takes place within 18 to 20 hours after ingestion. Copulation takes place in the depth of the mucosa and it is assumed that it occurs about 40 hours after ingestion. The relationship of the sexes of the intestinal trichinae is one male to two females.

* * * *

Swamp Fever Test Unreliable

The sublimate test[4] is neither specific nor characteristic for infectious anemia. The frequency of error on the positive side as well as on the negative side, tends to make this test very misleading.

Development of Trichinae

The muscle becomes infective on the seventeenth day after invasion (ingestion).[5] The capsule is formed by hyaline secretion of the perimysium, through which the trichinae migrate. When the trichina curls up, this hyaline secretion surrounds the worm in shape of a barrel which is open at both sides. Twenty-one days after ingestion the capsule closes; thirty-five days after ingestion the capsule formation is complete. The inflammatory reaction caused by the helminth toxins closes the barrel-shaped capsule. The fat formation on the poles of these capsules is of mesenchymal origin. The capsule of the trichina is practically free from nuclei, while the granulation tissue surrounding a sarcosporidium possesses nuclei to a greater or less extent.

* * * *

Diagnostic Value of Blood Examination in Tuberculosis

Tuberculosis causes changes in the blood depending on the activity of the process.[6] A negative blood picture is not a reliable means of excluding tuberculosis. The presence of tuberculosis is indicated by a moderate anemia, a low erythrocytic count, low hemoglobin content, the color index is normal or slightly lowered; there is either decrease in eosinophile leucocytes, or aneosinophilia. The nuclear shift to the left generally involves a shift of the relationship segmented nuclei to bands, but occasionally may affect the juveniles and the myelocytes. In addition to lymphocytosis, there, frequently, will be a considerable monocytosis. The presence of tuberculosis cannot be decided on the basis of the blood picture alone. The blood examination should be made use of in connection with clinical examination and in conjunction with other diagnostic aids.

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[4]Hecke, F., Der diagnostische Wert der Sublimatprobe bei der ansteckenden Blutarmut der Pferde (The Value of the Sublimate Test for the Diagnosis of Swamp Fever). *Arch. Tierheilk*, 67:5, pp. 410-419; 1934.

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Urinary Calculi

The symptoms of urolithiasis[7] are principally anorexia stranguria, occasional restlessness, and, in the progressive stage, uremia. The general symptoms become progressively alarming. Prevention may be achieved by rational feeding. When uremia has set in, it may be relieved by amputation of the processus urethralia immediately behind the concretions.

Administration of Glucose

For the artificial feeding of sugar[8] to dogs, it is preferable to use the stomach tube, than to apply it either subcutaneously, intravenously, or rectally. The oral route has the advantage in that larger amounts can be given; it is less dangerous also. The sugar level of the blood rises within five to ten minutes after its application. The maximal value is reached after 48 to 75 minutes in dogs, and after 105 to 150 minutes in horses. The specific gravity of the urine is influenced not only by the amount of sugar given, but also by its concentration.

Heart Lesions in Goitre

The examination of the hearts of eight animals[9] suffering from goitre disclosed that the lesions consisted partly of degenerative and partly of inflammatory processes, which did not show any relationship either to the variety of the tumor or its age, or the sex of the animals. No proof was found to connect the acute inflammatory lesions with the struma, but it is assumed that the degenerative processes are caused by a toxin of the struma.

Conditions Favoring Infection

Disease caused by parasites invading the body is the result of the host-parasitic relationship.[10] The unbroken skin with its secretion and the normal mucous membranes of the mouth and respiratory tract serve as effective barriers against many pathogens which commonly come in contact with these layers of the body. If the skin is broken or if the mucous mebrance be irritated, or the normal secretion temporarily in abeyance, the organism may gain entrance and disease may result. Groups of individuals long exposed to certain infections acquire a partial immunity to them. Individuals that maintain an equilibrium with the parasite without evidence of disease, are known as carriers; they may never exhibit symptoms, although they are frequently the most important source of danger to other, more susceptible, individuals. It is necessary that certain pathogenic organisms reach certain sites in the body before they produce fulminating infection. If the potentially pathogenic organisms actually gain entrance to the body tissues, two forms of mechanical defense are available to combat the infection; antibodies elaborated in the system, and phagocytic action of certain cells.

Electrical Treatment of Colic Unsatisfactory

The high frequency current cannot be used to advantage in the treatment of colics,[11] because the noise it produces, the strong light effect and the pain sensation from contact with the spark frightens the horse.

Anti-Fluke Measures

For the control of distonnasis[12] in marshy countries, it is recommended to fence the pasture, in addition to the application of mineral fertilizer and the disinfection of the watering places with copper sulphate.

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[12]Lührs, Bekämpfung der Leberegel—under Lungenwurm—seuche in den an die See grenzender Gebieten (Fight Against Liver Fluke and Lungworm disease in Maritime Regions). *Arch. Tierheilk*, 67:5, pp. 377-390; 1934.

Commercial Exhibits at the 12th International Veterinary Congress

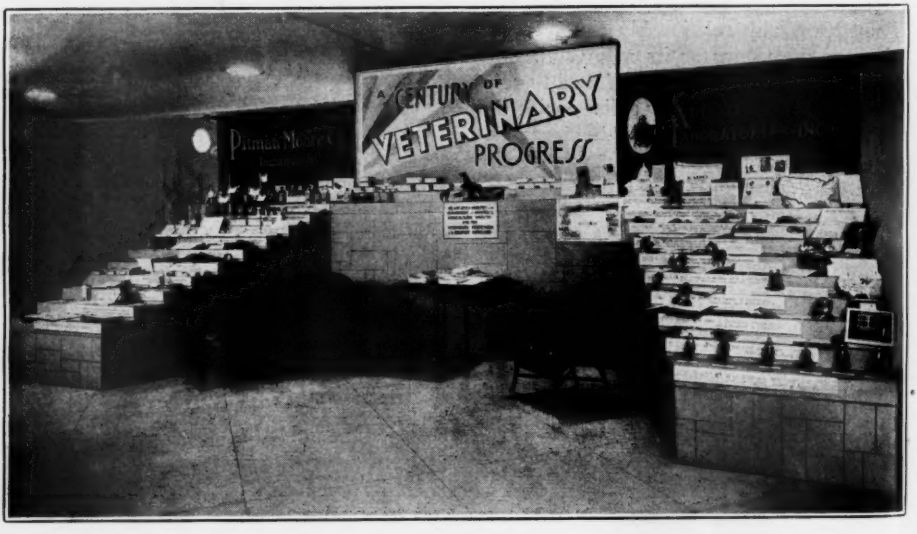
NO DESCRIPTION of the Twelfth International Veterinary Congress can be complete that omits mention of the splendid exhibits of the veterinary supply firms that constituted an important feature of the Congress. However, the limits of space precluded a description of these exhibits in the first report of the meeting published in the October issue of this magazine.

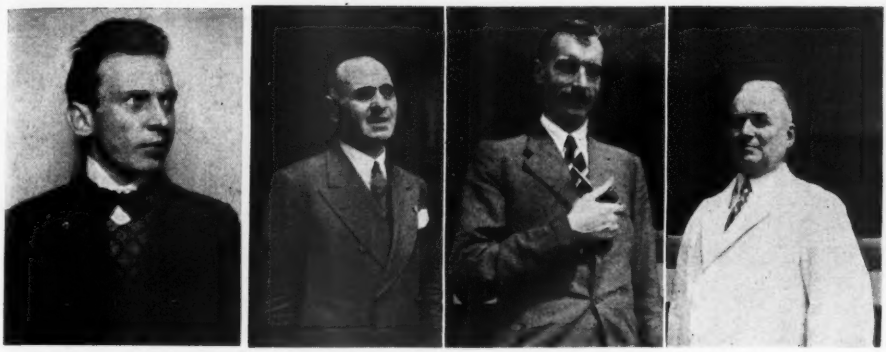
The exhibits were more elaborate and more numerous than at any previous veterinary meeting in this country, and contributed not only to the interest of the meeting and its educational value, but defrayed the expenses of the entertainment provided by the local committee, except for the state banquet. The firms that went to the expense and trouble of preparing displays of samples of their products and furnishing attendants to answer questions of interested persons, and that included about all who attended the Congress, are deserving of a lot of credit for the success of the Congress.

Three exhibits were strictly educational; that of the United States Department of Agriculture, which occupied an entire room and in a large measure was the same that the Department has shown at International Livestock Expositions and elsewhere; the veterinary historical exhibit of the Allied Laboratories, Inc., first shown at the American Veterinary Medical Association meeting in Chicago and following the meeting, at "A Century of Progress" in the same city and described in the October, 1933, issue of this magazine (pp. 425-8) to which the reader is referred; and the Chappel Kennel Foundation, an illustration of which is shown herewith.

The other exhibits were attractively displayed in booths in a large room, through which those attending sessions of the Congress passed in entering or leaving. Among the exhibits of unusual interest may be mentioned:

Fort Dodge Laboratories, Inc.—The display of the Fort Dodge Laboratories, Inc., contained a complete line of veterinary biologics, pharmaceuticals and supplies. It attracted a





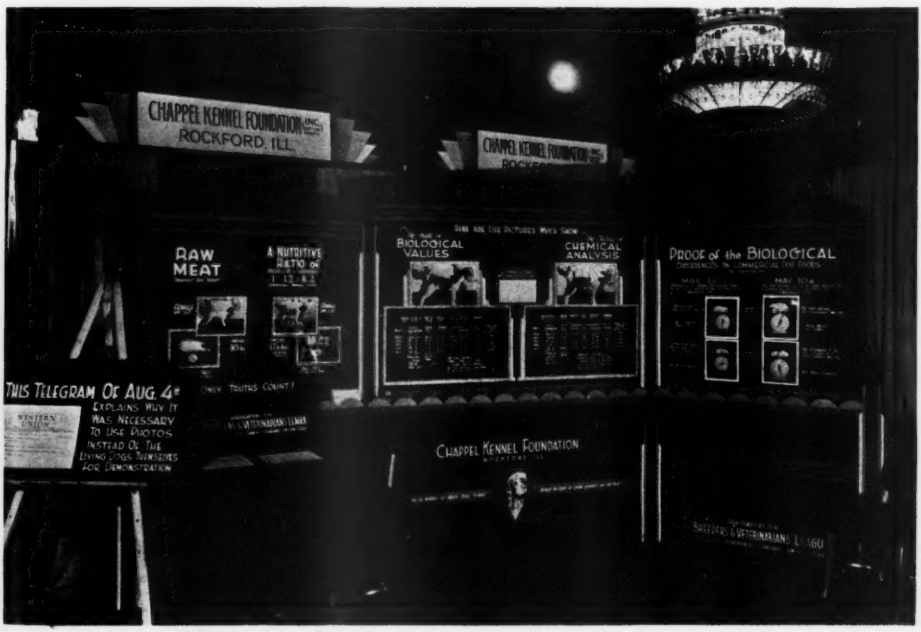
Delegates to the Twelfth International Veterinary Congress. Left to right: Dr. Lothar Ariess, Germany; Prof. Leonardo Grassi, Italy; Prof. Wm. Mitchell, Scotland; and Dr. John B. Jaffray, Chicago.

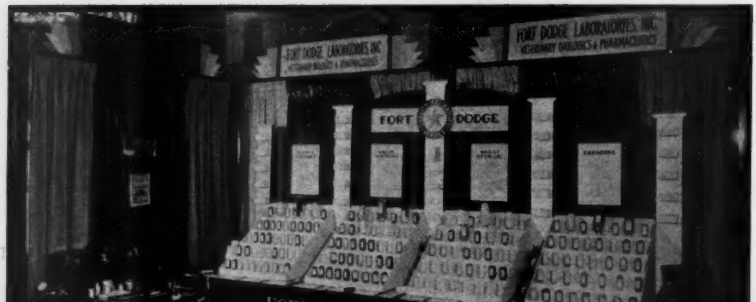
great deal of attention, much favorable comment and innumerable inquiries from visitors anxious to learn more of this midwestern firm whose distribution extends over the whole country. S. L. Barrett, sales manager, H. J. Shore, laboratory director, and Doctors Quin, York and Mosher were always on hand to answer inquiries.

John Morrell & Company.—This exhibit displayed Red Heart Dog Food manufactured by this company, with many signs pointing out the high quality of Red Heart and the advantages of the three flavors, beef, cheese and fish.

Ashe Lockhart, Inc.—This firm exhibited a complete line of veterinary bacterins, serums, vaccines and diagnostic agents for use in the control of infectious diseases of domestic animals. Attendants were always present to distribute an ample supply of pamphlets, reprints, etc., concerning the products and to answer inquiries.

Allied Laboratories, Inc. (Pitman-Moore Company).—The large exhibit of this enterprising firm occupied a conspicuous location in the center of the exhibit room. The exhibit displayed all the products of the firm, with the attractiveness shown in the illustration herewith.

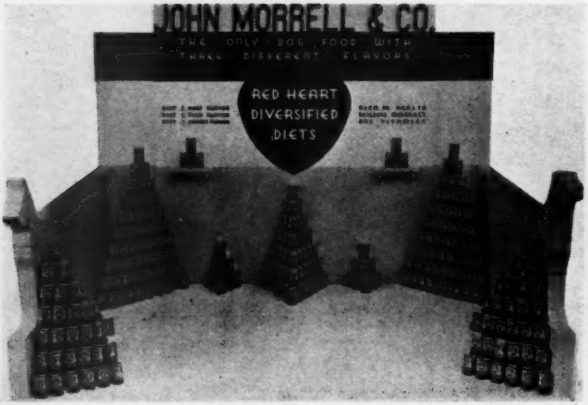

CHAPPEL KENNEL FOUNDATION INC.
ROCKFORD, ILL.
RAW MEAT
BIOLOGICAL VALUES
CHEMICAL ANALYSIS
PROOF of the BIOLOGICAL
THIS TELEGRAM OF AUG. 4th
EXPLAINS WHY IT WAS NECESSARY TO USE PHOTOS INSTEAD OF THE LIVING DOGS THEMSELVES FOR DEMONSTRATION
CHAPPEL KENNEL FOUNDATION



Lederle Laboratories, Inc.—A unique and unusually attractive feature of the Lederle exhibit was two Multiposter picture machines that flashed on and off, in rotation, large pictures of prominent veterinarians of this and other countries. The pictures shown in these machines included: William Zwick, Karl F. Meyer, Helding G. Magnusson, Raymond A. Kelser, Ernest C. Schroeder, Maurice C. Hall, Daniel E. Salmon, Leonard Pearson, Franz Von Hutyra, Herman Miessner, Frederick Hobday, I. E. Newson, W. L. Yakimoff, J. Russell Greig, Robert von Ostertag, P. J. du Toit, Otto Waldmann, Sven Wall, G. Ramon, Share Jones, Veranus A. Moore, John M'Fadyean, W. Frei, Valentin Stang, Jose Figueroa, G. W. Dunkin, S. Kondo, Robert Koch, Louis Pasteur, Theobald Smith, R. A. Osorio, Adelchi Negri, Arnold Theiler, C. D. McGilvray, William Arthur Hagan, O. V. Brumley, C. A. Cary, Charles Henry Stange, Ralph R. Dykstra, Ward Giltner, John R. Mohler, Marion Dorset, Duncan McEachran.

Denver Chemical Manufacturing Company.—This exhibit was built around a single replica of an enormous can of Antiphlogistine, typifying the singleness of purpose of this firm, which originated the product and ever since has adhered solely to its production and distribution to the confusion of countless imitators who have come and gone without attaining success comparable to that of the original cataplasm, or undermining confidence in its superiority.

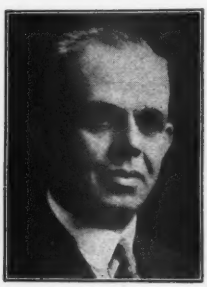
Rare Chemicals, Inc.—This exhibit showed the various forms in which Azamine is prepared for the use of veterinarians. The exhibit was so located that all who passed through the exhibit room of necessity passed it and a register kept of the visitors to whom literature concerning Azamine was distributed, showed the names of visitors from practically every country having delegates to the Congress.



Abbott Laboratories.—The most conspicuous part of this exhibit was a large papier-mache dog being operated upon under Nembutal anesthesia. The convenience of administering Nembutal was stressed and the fact that complete surgical anesthesia is produced by it. Sixty per cent of the American veterinarians who stopped at the booth stated that they employed Nembutal anesthesia in their practice. The foreign veterinarians to whom this form of anesthesia was less familiar, showed much interest in its advantages. The various vitamin and nutritional products also displayed in the exhibit created considerable interest, as did the display of Metaphen products and the Allergens for intradermal tests in diagnosing sensitization to various proteins.

Jensen-Salsbery Laboratories, Inc.—The exhibit of the Jensen-Salsbery Laboratories is always a live one, since it consists in the main of Doctos Graham and Salsbery in person, and therefore is one of the most attractive in any show room. In this instance, they were assisted in entertaining visitors to their booth by Dr. N. F. Williams. In addition, the exhibit reflected the capacity of this institution not only by a complete line of pharmaceutical and biological products, but a complete display of surgical instruments. Among the biological products featured was tetanus toxoid, abortion and pullorum antigens, with full equipment for making the tests. Other products included were: distemper prophylactics; intradermal anthrax vaccine; anthrax vaccine with Saponin; Forgan, a fetal extract for the treatment of various skin affections; parathyroid hormone; calcium gluconate; a new urine testing outfit for the diagnosis of acetonemia; thybromol outfit; chemical branding paste, and many new or improved instruments.

G. G. Graham



C. E. Salsbery

Hynson, Westcott & Dunning, Inc.—This booth featured Mercurochrome and Thantis. A unique feature supplied by this firm was an attendant who spoke fluently all official languages of the Congress and many others; thus acting as an information bureau and a great convenience to many in attendance who understood English but poorly, or not at all. Considerable interest was shown by the veterinarians in Thantis Lozenges as a treatment for pharyngitis and other throat irritations.

Wilson & Company.—The Wilson & Company exhibit emphasized the force of simplic-

Analytical and Control Laboratory, R. J. Strasenburgh Company.

ity in advertising. The display was built around a very large dummy can of Ideal Dog Food. At the base of the exhibit, in glass jars,

was shown the actual ingredients that go to make up Ideal Dog Food and the proportion of each—a new departure in dog food advertising. This was flanked by a large wooden cut-out of a champion Boston terrier which was raised exclusively on Ideal Dog Food, explained by a small card bearing a photograph of the champion together with his history and pedigree.

R. J. Strasenburgh Company.—This display consisted of 100 products of standardized pharmaceuticals for both large and small animals. Interest was shown in their large "fluid extract tablets." These tablets, one inch in diameter, were made to contain sufficient powdered extract to represent one ounce of the official fluid extract of the drug. When dropped into one ounce of water, they immediately disintegrate to make the equivalent of an ounce of fluid extract ready for administration in a dose syringe. They also displayed samples of their line of liquids, powders, and ointments for both small and large animals, and Tonamine, a vitamine reconstructive which they had just put upon the market.

Bard-Parker Company, Inc.—The Bard-Parker exhibit consisted of a complete display of detachable blade knives, renewable edge scissors, Lahey lock forceps and Bard-Parker germicide and sterilizing containers. Included in the scissors display was a new offset scissor, stainless steel, designed to replace the curved dissecting scissor. The germicide display showed the corrosive effects of variously used chemical germicides upon metal instruments. Mr. Allan McLeran, advertising manager, who was in charge of the exhibit, expressed great surprise at finding 90% of the veterinarians who visited the exhibit, thoroughly familiar with Bard-Parker instruments and, in most cases, a user of them.

The Haver-Glover Laboratories. — The Haver-Glover Laboratories, manufacturers of pharmaceutical specialties, biological products and surgical instruments, presented an attractive display, combining these three lines.

Among the pharmaceutical specialties exhibited, which portray progress in veterinary medicine, were Hypodermin, the transcutaneous counter-irritant, an iodine compound employed as a general substitute for firing; Chaulmuricin, representing the chaulmoogra oil idea in the treatment of follicular mange in dogs; Calci-Nephin, the original French mineral-hormone employed to correct states of demineralization; and Glucose Solution 50%, which has popularized glucose therapy in clinical veterinary medicine.

In the biological field, this laboratory featured three original products, anthrax bacterin with which animals may be solidly immunized against anthrax without danger of causing the disease, mixed bacterin, canine, for the immunization of dogs affected with distemper against cerebro-spinal complications, and anti-canine distemper serum (homologous) and

canine distemper antigen for the standard immunization of dogs against distemper.

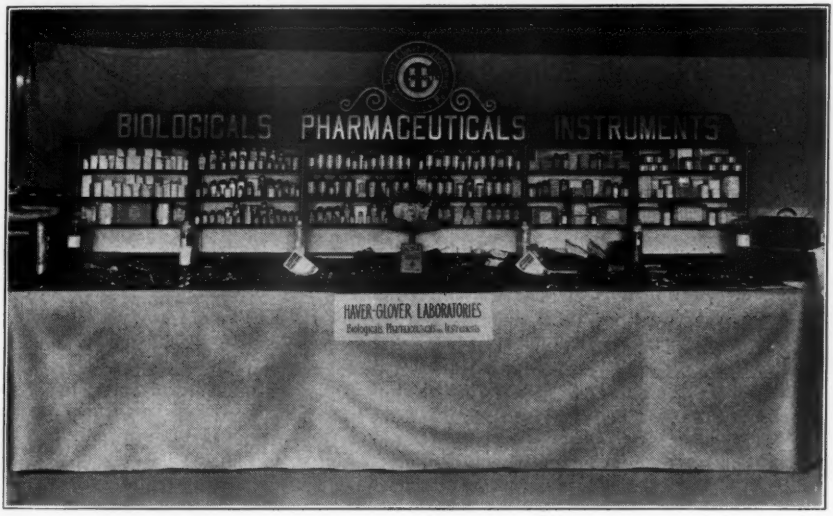
The instrument department featured an elaborate display of scientific apparatus: Microscopes; blood, urine and milk testing outfits; improved otoscopes and endoscopic instruments specially designed for veterinary use; electric cauteries for use both in the hospital and in field work. A significant observation by the director of the instrument department was the pronounced interest in large dental instruments, for which for more than a decade there has been little demand. Mouth specula, molar cutters and extractors were examined with a great deal of care by many of the visitors who came to this booth.

Carl Zeiss, Inc.—Exhibited a selection of their well known optical instruments. Particular mention may be made of the Pulfrich Photometer which permits rapid colorimetric and debility determinations with a degree of accuracy hitherto unattainable in work of this type. Mention was made of the new models of microscopes H and L which represent a radical departure from previous designs. The new instruments not only present an agreeable modern form but also are more steady than the older constructions. A feature of importance in high-power microscopy.

Coast Fishing Company.—This exhibit consisted simply of cans of Balto Dog Food and attendants were always present who understood the product and could give visiting veterinarians information concerning it. Copies of booklets describing the manufacture and quality of the product were distributed and samples sent to all who left their names at the booth.

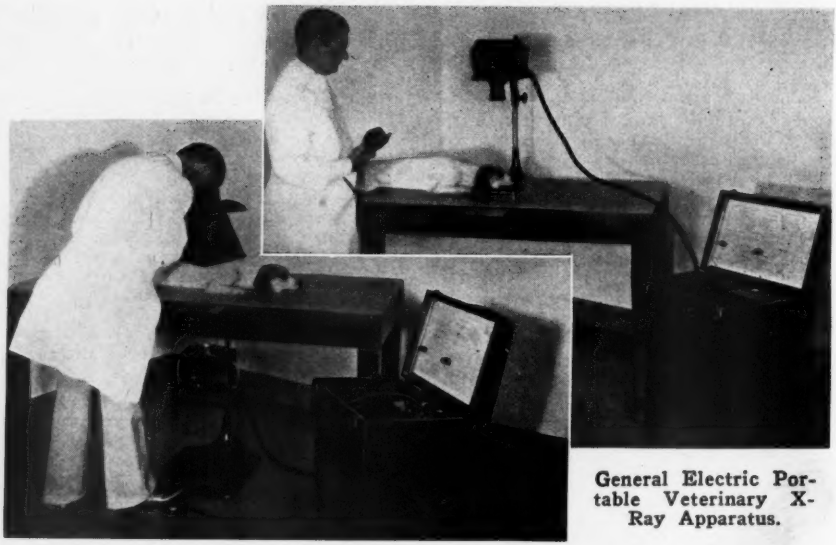
The Cutter Laboratory.—The Cutter Laboratory exhibited a motion picture film on Equine Encephalomyelitis prepared by Dr. Karl F. Meyer of the Hooper Foundation. The film contains a graphic history of the disease from its first inception in 1930 in the San Joaquin Valley to its final spread throughout a great area of the United States and its recognition in many foreign countries. It portrays a valuable picture of the clinical symptoms of this disease in its various stages, and the methods devised for its control. Of interest too is the laboratory portion of the film showing the virus etiology of encephalomyelitis and its passage through series of laboratory animals. Professional groups who are interested in showing this interesting and instructive film may have it at any time by writing to the Cutter Laboratory, Berkeley, California.

Merck & Company.—Merck's exhibit marked the first exhibit of this time-honored firm of manufacturing chemists at a veterinary meeting in this country. About 50 of the approximately 3,000 items manufactured were chosen for the exhibit as those chemicals most commonly used by veterinarians. In addition to these, several specialties, such as Veterinary Creolin-Pearson, Cuprex, Iodine Suspensoid Merck, Iodine Vermicide Merck, Neo-arsphenamine, Stovarsal and Tryparsamide Merck were displayed.



The cut-away can of Merck Ether revealing the coil of iron wire used to prevent the formation of peroxides seemed to attract considerable interest.

A great many veterinarians and veterinary students took advantage of the special offer to obtain copies of Merck's Index and the new edition of the Merck Manual. The Index contains a great deal of information useful to



General Electric Portable Veterinary X-Ray Apparatus.

veterinary practitioners. Numerous questions were answered involving technical problems in pharmacology, chemistry, etc.

Faichney Instrument Corporation.—In this exhibit were shown a large line of veterinary thermometers, hypodermic syringes and needles.

Becton, Dickinson & Company.—Becton, Dickinson & Company showed a complete line of veterinary syringes and needles, dose syringes and veterinary thermometers. Much interest was shown in these various products and especially in the Cornwall Syringe, which is a self-filling syringe for use in the convenient and rapid transfer of definite amounts of brom-thymol-blue solution in the performance of the "Brom-thymol-blue" test for milk in the diagnosis of mastitis. The syringe is specially fitted with a metal guard to protect it against breakage. In the laboratory, this syringe is designed for the rapid transfer of definite quantities of solution in performing the agglutination tests on certain diseases, such as Bang's disease in cattle and bacillary white diarrhea in poultry. The newest product in the Becton-Dickinson veterinary line is a convenient and efficient veterinary intravenous injector.

General Electric X-Ray Corporation.—The exhibit of this firm was a surprise to most of those in attendance, who had not known that an X-ray apparatus could be made so compact and portable without restricting its usefulness. One outfit was set up for use in the booth and was continually demonstrated to all interested.

Veterinary Medicine.—All visitors to this booth were given copies of the Souvenir Congress issue of the magazine, containing a welcome to the foreign delegates in the four official languages, information concerning the veterinary educational institutions of this country, many halftones of leaders of the Congress and other information concerning the meeting.

Among other exhibitors were included: Biocerta Corporation; Universal Products Corporation; Laboratory Products, Inc.; Davis & Geck, Inc.; Man-Kind Dog Food; Menley & James, Ltd.; Grubel Products Company; Campbell X-Ray Company of Boston; Swift & Company—Pard Dog Food; The National Provisioner; and A. V. M. A. Liability Insurance.

NOTICES OF JUDGMENT UNDER THE FOOD AND DRUGS ACT*

21815. Misbranding of Dr. Hess Hog Special. U. S. v. Twelve 7-Pound Packages of Dr. Hess Hog Special. Default decree of condemnation forfeiture, and destruction. (Dr. Hess and Clark, Inc., Ashland, Ohio.)

Examination of the drug preparation. Dr. Hess Hog Special, disclosed that it contained no ingredient or combination of ingredients capable of producing certain curative and therapeutic effects claimed in the labeling.

Analysis of a sample of the article by this department showed that it consisted essentially of sodium chloride, ferrous sulphate, charcoal, copper sulphate, sodium nitrate, nux vomica, quassia, calcium carbonate, magnesium carbonate, and a phosphate.

It was alleged in the libel that the article was misbranded in that the following statements appearing on the carton and in a circular shipped with the article, regarding its curative and therapeutic effects, were false and fraudulent: (Carton) "Combats Worms (Ascarids) * * * Regularly used, Dr. Hess Hog Special keeps in the intestines vermifuges and vermicides which are constantly at work. By this principle it not only combats the adult worms present in the intestines, but also acts upon the young parasites as they are reintroduced into the alimentary canal from the blood stream. This method of treating does not require starving or individual dosing. * * *"

21824. Misbranding of Tarolfectant. U. S. v. Sioux Oil Tar Disinfecting Co., Sioux City, Ia. Plea of guilty. Fine, $50 and costs.

Examination of the drug products, Tarolfectant, disclosed that it contained no ingredient or combination of ingredients capable of producing certain curative and therapeutic effects claimed in the labeling.

Analysis of a sample of the article by this department showed that it consisted essentially of coal tar oils.

It was alleged in the information that the article was misbranded in that the following statements regarding the curative and therapeutic effects of the article were false and fraudulent: "Hog Flu * * * Directions for Hog Flu * * * Three treatments in nine days should make all your hogs * * *"

21798. Misbranding of Rabbit Supto. U. S. v. 40 Quart Cans of Rabbit Supto. Default decree of condemnation, forfeiture, and destruction. (Supto Mfg. Co., Des Moines, Ia.)

Examination of the drug product, Rabbit Supto, disclosed that it contained no ingredient or combination of ingredients capable of producing certain curative and therapeutic effects claimed in the labeling.

Analysis of a sample of the article by this department showed that it consisted essentially of coal tar light oil, high boiling mineral oil, and small proportions of formaldehyde and eucalyptus oil.

It was alleged in the libel that the article was misbranded in that the statement on the label, regarding the curative and therapeutic effects of the article, The fumes from evaporation after use in the hutch will satisfactorily combat colds and snuffles," were false and fraudulent.

*From report of Food and Drug Administration, U. S. Dept. of Agriculture.

ARMY VETERINARY SERVICE

Major Elwood L. Nye is, in addition to his other duties at the Presidio of San Francisco, Calif., detailed as port veterinarian, San Francisco port of embarkation, Fort Mason, Calif., and to duty at the headquarters 9th Corps Area.

The promotion of Lt. Col. Alfred L. Mason to the grade of colonel, with rank from November 13, 1934, is announced.

2d Lt. Curtis W. Betzold now on duty at Carlisle Barracks, Pa., will report to the commandant M.F.S.S., that station, on or about December 29, 1934, for duty for the purpose of pursuing the basic course of instruction.

2d Lt. Wm. E. Jennings is relieved from further assignment and duty at Ft. Leavenworth, Kans., and will proceed to Carlisle Bks., Pa., and report to the commandant M.F.S.S. on or about December 29, 1934, for duty for the purpose of pursuing the basic course of instruction.

Veterinary Reserve Corps

Promotions:

Shaffer, Xenophon Bryan, to: Capt., 702 S. Richardson Ave., Vicksburg, Mich.

Starnes, Mervyn Benson, 1st Lt., 304 City Hall Annex, Dallas, Texas.

New Acceptances:

Adan, Cirilo Lagmay (Filipino), 2nd Lt., 1123 N. Jefferson, Junction City, Kans.

Cox, John Leverton, 2nd Lt., 2365 Warren St., Toledo, Ohio.

Ebert, Edgar Frazier, 2nd Lt., 7230 Wornall Rd., Kansas City, Mo.

Groppe, Carl Wm., 2nd Lt., Stamms Lane, Wheeling, W. Va.

Orr, Norton Allison, 2nd Lt., 616 S. Howes St., Fort Collins, Colo.

Siemer, Everett John, 2nd Lt., 4524 Milwaukee St., Denver, Colo.

From January 1 to November 1, 1934, more than two million tuberculin tests were applied to cattle in Iowa. Of this number a trifle more than 28,000 were classified as tuberculous. Eighty-eight counties at this time are in modified accredited area and it is predicted that by January 1, 1936, the entire state will be in that category.

The Oklahoma State Board of Veterinary Medical Examiners will hold a regular examination at the Capitol Building, Oklahoma City, January 16, 1935, the day following the state association meeting. Any veterinarian wishing to qualify should report at the State Veterinary Office at 8:30 A. M. on the above date. Information and application blanks may be obtained from Dr. Walter H. Martin, secretary, 101 S. Evans St., El Reno, Oklahoma.

"We're in the dark, Doctor, about getting the canned dog food that's BEST for us. But they do say that the 'B.V.' story which Chappel Bros. are telling about Ken-L-Ration, is going to pull the blindfold from the eyes of our owners, too. How about it?"

Well, Doctor, to answer this mute appeal, you know that B.V. stands for Biologic Value. We maintain, and believe that you agree, that Biologic Value is the only scientific standard by which the real worth of canned dog foods can be measured. A food's *Biologic* Value is determined only by careful study of the long-run effect it has on the LIFE of dogs and other animals used for experimental purposes. Chappel scientists for a number of years have been going BEYOND ingredients and chemical analysis. *Biologic* studies have established the superior nutritive and body-building value of Ken-L-Ration. Insofar as lies within our power, we are out to protect the health, strength and vitality—indeed the very life—of this and future generations of dogs.

We will appreciate your recommending Ken-L-Ration, in either Horse Meat (yellow label) or Beef (white label).

CHAPPEL BROS. INC.
Rockford, Illinois

Your Clients

—rely upon you to supply trustworthy dog food. You will find it easy to do this by having your formula packed in Kansas City by the packers of Silver King. This department of our business is handled on a cost-plus basis.

Send formula and quantities required and we will quote.

DR. W. H. GATCHELL & SON, INC.
1714 Locust Street
KANSAS CITY, MISSOURI

FARMERS IMPROVE HORSE BREEDING METHODS

J. W. Young, Bismarck, Illinois, who buys horses and mules throughout a 150 mile radius in central Illinois and Indiana, reports that it is his observation that farmers are using much better judgment in breeding their mares now than in years past.

"A man with a long legged, slab sided mare," said Mr. Young, "used to breed her to the nearest available horse, but now realizes that he must breed such a mare to a thick, low set, blocky horse if he is to receive good results. He consequently looks around the country until he finds a horse of the required type, and then arranges to have the mare bred to that horse. The stallionier loads the stallion in a truck and drives across and breeds the mare.

"Stallions are breeding more mares now, with

PATTON BIOLOGICAL LABORATORIES

Formulas · Consultation
Biological Testing

"Dog, Cat, Fox Food Exclusively"

Address all correspondence to
DR. J. W. PATTON
P. O. Box 933 **E. Lansing, Mich.**

AMERICAN RESEARCH WORKERS

are pointing the way to a practical method of Bang's Disease Immunization through

CALFHOOD VACCINATION

A contribution to experimental research, of profound importance to the livestock industry, is casting new light on one of the most troublesome problems that has confronted the veterinary profession.

Vaccination of calves four to six months of age has been shown to produce immunity to Bang's disease. Agglutination reactions subside within a short time and the result is a negative herd with comparatively high resistance to Bang's Disease infection. The method is economical and practical for application under average farm conditions.

Jen-Sal ABORTION VACCINE

is the correct product to use for calfhood vaccination

Prepared from a strain of Brucella abortus of low virulency, furnished by the U.S.B.A.I., grown on solid media for the production of a standardized vaccine.

Per dose (20 c.c. vial), 40c—*Code word "Job"*

12 doses (240 c.c. vial), $4.80—*Code word "Jiblet"*

(Less 10% Cash Discount)

JENSEN-SALSBERY LABORATORIES INC
KANSAS CITY, MO.

less effort, because a great many of the stallioniers are using light trucks to move their stallions from place to place," continued Mr. Young. "They will drive out eight or ten miles before breakfast, breed a mare, and return within an hour's time. They take the stallion out again that night after supper and breed another mare. This is easier on the horse and saves the stallionier's time. For exercise the stallion is permitted to run out in a three acre paddock with access to grass and water, but with opportunity to go into a box stall in the corner of the paddock, whenever he wants to get away from the flies. Burlap hanging over the doors brush the flies off as he goes in, and in a cool, dark well ventilated stall the stallion is comfortable throughout the heat of the day.

"Another significant thing," said Mr. Young, "is the fact that a good many farmers, in neighborhoods where there are no stallions available, have clubbed together to buy good two-year olds. Sometimes the colt is registered and sometimes he is not, but in any event he is a deep middled, power-

National "VOLLSTEDT" ELECTRIC CAUTERY
ELIMINATES HEMORRHAGE & INFECTION

Essential Equipment for Modern Veterinary Surgery
Large Animal Practice and Small Animal Clinic

For: Polypi-Fibromas of Uterus—Cecetomies—Pyometras—Warts—Breast, Melanotic, "Bull's Eye" Tumors—Castration—Point and Line Firing—Teat Fistulae—Cervical Cauterization.

National "Twin Control" Cautery for 110 V. 50-60 Cycle A. C. No. V 35 with "Trigger" Handle and 3 tips $33.50

SEE YOUR DEALER . . . Write us for additional information

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HEMORRHAGIC SEPTICEMIA
Its Prevention and Treatment in
Cattle, Horses, Sheep, Goats, Swine and Fowl

A few cents spent today for prevention will save you many dollars in treatment when the disease presents itself.

For Prevention

HEMORRHAGIC SEPTICEMIA VACCINE *Lederle*
Whole Culture Vaccine undiluted, chemically killed—Vials of 10 and 50 doses

HEMORRHAGIC SEPTICEMIA AGGRESSIN *Lederle*
Sterile tissue extract—Vials of 10, 20 and 50 doses

For Treatment

ANTI-HEMORRHAGIC SEPTICEMIA SERUM *Lederle*

One of the most effective anti-bacterial sera employed in the veterinary field.

Its exceptional potency has been demonstrated by standardization tests and by its curative value in field use.

The serum is recommended for immediate protection when the time available is insufficient to confer active immunity with vaccines or aggressins.

The sick or infected animal should be given serum early, in doses of 50 to 100 c.c. Frequency of injections will depend on the results obtained from the first dosage. *Literature on request.*

LEDERLE LABORATORIES INC., 511 Fifth Avenue, New York

Here's an Effective Reconstructive

TONAMINE

Use TONAMINE for building up the strength of convalescent animals . . . for undernourished puppies . . . for distemper . . . and for keeping small animals "fit." TONAMINE contains a large quantity of Vitamin B Complex, known as Vitamins B and G. Also contains Vitamin D, the sunshine Vitamin. Works wonders as a general reconstructive. Order an ample supply NOW!

FREE Booklet

Write today for new booklet "Can You Keep Your Small Animals Out of the Rough?"

R. J. STRASENBURGH CO.
Rochester, N. Y.
Pharmaceutical Chemists Since 1886

ful type with good quality. He is broken and put into work and also used to breed eight or ten mares owned by the two or three farmers who own the stallion colt in question.

"Following this plan, the colt is worked throughout the season and he fills in usefully, though usually given some advantage on the evener to allow for the fact that he is only a two-year old colt working against mature horses.

"In addition the farmers who breed mares to such a colt have saved the service fees, which generally amount to $15 on each living colt dropped. This frequently amounts to $90 or $100 for the colts sired by such a two-year old stud.

"In the fall the colt is altered, worked throughout the winter and is ready for sale in the spring

FILSOL
(HAYS)

for Heart Worms (Canine Filariasis). An isotomic double salt of Antimony in solution ready for intravenous use.

Sold Through the Veterinary Profession Only.

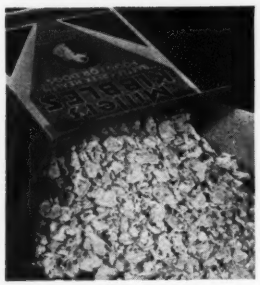
2cc Test Dose	$0.20 ea.;	six for	$1.00
5cc	0.40 ea.;	box six for	2.25
10cc	0.40 ea.;	six for	3.00

For literature write

Southern Ampoule Company, 268 Spring Street, Atlanta, Georgia

When Sun Is Scarce Recommend MILLER'S FOODS

RICHER IN VITAMINS B, D, G



A tasty, highly nutritious food used in many leading hospitals.

Adding Fleischmann's Irradiated Dry Yeast to Miller's has made these foods even more ideal for winter feeding—richer in vitamins B, D, and G—whose value in dog nutrition you well know.

When your client says, "—and what shall I feed him this winter, Doctor?" —Recommend Miller's Kibbles as the basic vitamin-fortified diet, with table scraps or meat mixed in for variety.

We'll be glad to send samples so you can see for yourself how good such advice will be. Kibbles are also ideal for hospital diet schedules—unvarying high quality at reasonable cost.

Make the MILLER 2 WEEK TEST

Special FREE Offer

Try the new Miller's Kibbles at our expense. Your name on the coupon below will bring you a full size package. We do not make or sell dog remedies.

Good Only East of Rockies

Battle Creek Dog Food Co.,
1233 State St., Battle Creek, Mich.

Gentlemen:

Kindly send me the professional sample of Miller's Kibbles.

Doctor .....

Address .....

City..... State.....

MASON'S *Kennel Fences*

Best for Dog Hospitals and Boarding Kennels

$69.55 and up

Mason's are Real Kennel Fences—Strong, Good Looking and sold under a Money Back Guarantee to hold the largest and strongest dogs. Used and approved by best Kennels everywhere.

SEND FOR FREE CATALOG

Describing Permanent and Movable Dog Fences, Kennel Stalls, and Gates at Low Direct Factory Prices.

MASON KENNEL FENCE CO., Box 77, Leesburg, Ohio

"Dejem"

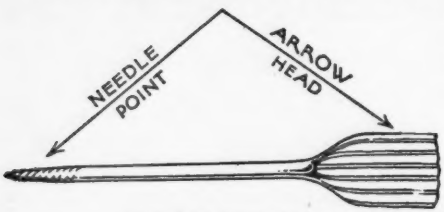
CANINE DISTEMPER COMPOUND

"Dejem" is not only decidedly beneficial to dogs with DISTEMPER but also controls the severe sickness following inoculations.

"Dejem" 16 oz. size, 1 bot. .....$ 2.75
3 bot. .....$6.75, 6 bot. $12.00

Mangan & Co., Laboratories
294-298 E. 161st St. New York

MOORE BROS. "PURPUL" MEDICATED WAX TEAT DIALATORS



Note the Needle Point and Arrow Head. Each Dilator re-inforced with eight small sterilized threads equally distributed. Adds to strength, makes them easier to insert and prevents the Medicated Wax from separating and flaking off. No wire re-inforcements. Not packed in grease.

Length	Per 100	Per 1,000
2¾ in. Regular	$0.75	$5.00 Postpaid
2¾ in. Thick	1.00	7.75 Postpaid
4 in. Regular	1.00	7.75 Postpaid
4 in. Thick	1.25	8.25 Postpaid

THE MOORE BROS. CORP., DEPT. V, ALBANY, NEW YORK

Behind MERCUROCHROME

(dibrom-oxymercuri-fluorescein-sodium)

HWD *is a background of*

Precise manufacturing methods insuring uniformity

Controlled laboratory investigation

Chemical and biological control of each lot produced

Extensive clinical application

Thirteen years' acceptance by the Council of Pharmacy and Chemistry of the American Medical Association

A booklet summarizing the important reports on Mercurochrome and describing its various uses will be sent to veterinarians on request.

HYNSON, WESTCOTT & DUNNING, Inc., Baltimore, Md.

as a good rugged gelding. I personally know of a number of instances where two-year old colts are being used in this way as work animals and as sires, and I believe more and more of our corn belt farmers are going to adopt the plan.

"You can tell the general public," concluded Mr. Young, "that farmers have definitely gone back to horses for farm work and the predominant desire of most farmers today is to raise as many colts as they can at the earliest possible moment to take care of their future replacement needs." —*Horse and Mule Ass'n.*

J. F. DeVine recently broadcasted over station WGNY on the subject of canine distemper, giving a history of the disease, suggestions concerning nursing and a description of the Lockhart and Laidlaw-Dunkin methods of prevention.

"The Bloodless Phlebotomist," Vol. VIII No. 2, which is being mailed to every physician and veterinarian in the United States, is replete with interesting articles written by physicians who are located in many different countries and while the purpose of the publication is to acquaint its medical readers with Antiphlogistine, readers will find a number of items and illustrations which will excite their curiosity and interest. Altogether, 1,347,000 copies are printed in nine languages and distributed throughout the world except in the countries of Russia, Latvia and Bulgaria.

If you do not receive a copy write to the Denver Chemical Manufacturing Company, New York, who will place your name on their list. The journal will be supplied you free of all charges.

The INDIAN VETERINARY JOURNAL

"THE INDIAN VETERINARY JOURNAL." Published quarterly. Subscription Rs.4/—for profession and Rs.8/—for others. Is the only journal of its kind in India, devoted to Veterinary Medicine, Surgery, and kindred subjects. It contains also the cream of current literature, and is valuable alike to Veterinarians and Agriculturists. It circulates all over the world, and is the best medium for advertisement. All communications should be addressed to the Editor.

MR. P. SRINIVASA RAO, G. M. V. C.
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You Can SAFELY *Recommend*

Ideal DOG FOOD

Because:

1. It is made from selected cuts of meat.
2. It is wholesome and nutritious.
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4. It is manufactured by a firm with a reputation for high quality food products.

IDEAL — An Ideal Meal For Any Dog

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We should be pleased to have you write for samples.

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EMPIRE BEEF & PROV. CO.,
Dog Food Division of

WILSON & CO.

General Offices:
4100 S. Ashland, Chicago, Ill.

CONSISTENTLY ACCURATE BLOOD TESTS!

Certified Brand—Concentrated
HUDDLESON METHOD
Br. Abortus Antigen

Prepared and standardized in strict accordance with the method perfected by Dr. I. F. Huddleson; from Br. Abortus strain carefully checked for agglutinability and sensitivity. A more reliable Antigen.

SAMPLES SUBMITTED ANY STATE LABORATORY

PRICE: Standardized dropper with each 20 cc (200 tests) $2.50

Less 10% for cash or in ten days.

Write for prices on testing equipment.

Certified Brand
"TORPEDO" *Bot or Strongyli* **CAPSULES**
(LIQUID)

- Liquid carbon disulphide proved 99.3% effective by Government test.
- Full six or three dram dosage.
- Safety-sealed . . . leak proof.
- Not brittle in cold weather. Pliable. Thick-walled.
- Eliminate handling gaseous, poisonous drugs.
- Free circulars and cards for your clients. These emphasize saving in feed and doctor bills, revitalizing unthrifty animals, etc. Illustrated. Business builders for the veterinarian.

TORPEDO Liquid Carbon Disulphide Caps.

25, 6-dram.....$2.75; 100 6-dram.....$10.00
20, 3-dram..... 1.70; 100 3-dram..... 7.50

TORPEDO CARBON Tetrachloride Caps.

25, 6-dram.....$2.75; 100 .....$10.00

Less 10% for cash or in 10 days.

NORDEN LABORATORIES
"The Mark of Quality"
LINCOLN NEBRASKA

Classified Advertisements

For Sale, Wanted, etc., $2.00 for 25 words or less; additional words, 8 cents. 25 cents extra when replies are sent in care of VETERINARY MEDICINE.

December-Christmas 50c souvenir issue of DOG WORLD—annual review of all dog matters. Can furnish cash or C. O. D. any dog book published. Judy Publishing Company, 3323 Michigan Blvd., Chicago, Ill.

FOR RENT: Modern veterinary office and equipment. Good practice and territory for a good practitioner. Owner deceased. Address: Mrs. Mabelle Liebenstein, Grafton, Wisconsin.

WANTED: Late model canine operating table, Empaco preferred. Address No. 120, care of VETERINARY MEDICINE.

WANTED: Experienced laboratory man by a commercial concern. Some business training would be an advantage. Address: No. 119, care of VETERINARY MEDICINE.

WANTED: Second hand instruments, of all kinds. Also dental instruments. Give full description and best cash price. Address: A-P Laboratories, 901 W. 29th St., Wichita, Kansas.

Gordon Danks recently disposed of his practice in New Jersey to accept a position as instructor in the Department of Surgery and Medicine at the Kansas State College, Manhattan.

At the Iowa State Fair Horse Show, Dr. Frank M. Wilson's (Mechanicsville) saddle horse, "Laddie Boy" won First in Pairs; second, in State Owned; third in Open Class and third in Combination Class.

NEBRASKA VETERINARY CLINIC

The first annual summer clinic of the Nebraska State Veterinary Medical Association was held at David City, Nebraska, June 28, 1934. Local arrangements were under the capable direction of S. W. Phillips, President of the Association, assisted by J. D. Sprague and H. Cross of David City. The clinic committee composed of Darrell E. Trump, Utica, Chairman; O. H. Person, Wahoo; and G. H. Leenerts, Humphrey is to be congratulated upon the material assembled, and the handling of same.

More than 150 veterinarians registered, including visitors from Iowa, Kansas and Missouri. There was not a dull moment during the entire day, and the various operators demonstrated clearly that Nebraska veterinarians are keeping abreast of modern progress in veterinary science.

Contributing to the success of the program was the X-ray equipment supplied by the General Electric Company, for demonstration purposes. Swift & Company and Armour & Company, in cooperation with the Omaha personnel of U. S. Bureau Inspectors, provided a pathological display which was transported to David City in a refrigerated truck by the Corn States Serum Company.

In addition to the facilities of Doctor Phillip's veterinary hospital, a large tent with amphitheater seats was used to accommodate those in attendance. Operating table, stocks, casting arena, etc., provided ample facilities for handling material presented. The clinic got under way promptly at 8:00 o'clock in the morning, and it was that hour in the evening before all cases were disposed of.